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60/048,893	6 June 1997 (06.06.97)	US
60/048,964	6 June 1997 (06.06.97)	US
60/048,884	6 June 1997 (06.06.97)	US
60/048,894	6 June 1997 (06.06.97)	US
60/048,971	6 June 1997 (06.06.97)	US
60/048,885	6 June 1997 (06.06.97)	US
60/049,375	6 June 1997 (06.06.97)	US
60/048,881	6 June 1997 (06.06.97)	US
60/048,880	6 June 1997 (06.06.97)	US
60/048,896	6 June 1997 (06.06.97)	US
60/049,020	6 June 1997 (06.06.97)	US
60/048,876	6 June 1997 (06.06.97)	US
60/048,895	6 June 1997 (06.06.97)	US
60/049,019	6 June 1997 (06.06.97)	US
60/048,916	6 June 1997 (06.06.97)	US
60/048,970	6 June 1997 (06.06.97)	US
60/048,972	6 June 1997 (06.06.97)	US
60/048,949	6 June 1997 (06.06.97)	US
60/048,974	6 June 1997 (06.06.97)	US
60/048,883	6 June 1997 (06.06.97)	US
60/048,897	6 June 1997 (06.06.97)	US
60/048,898	6 June 1997 (06.06.97)	US
60/049,373	6 June 1997 (06.06.97)	US
60/048,917	6 June 1997 (06.06.97)	US
60/048,962	6 June 1997 (06.06.97)	US
60/048,878	6 June 1997 (06.06.97)	US
60/049,374	6 June 1997 (06.06.97)	US
60/048,875	6 June 1997 (06.06.97)	US
60/048,899	6 June 1997 (06.06.97)	US
60/048,877	6 June 1997 (06.06.97)	US
60/048,963	6 June 1997 (06.06.97)	US
60/057,651	5 September 1997 (05.09.97)	US
60/057,769	5 September 1997 (05.09.97)	US
60/057,643	5 September 1997 (05.09.97)	US
60/057,645	5 September 1997 (05.09.97)	US
60/057,668	5 September 1997 (05.09.97)	US
60/057,635	5 September 1997 (05.09.97)	US
60/057,627	5 September 1997 (05.09.97)	US
60/057,567	5 September 1997 (05.09.97)	US
60/057,666	5 September 1997 (05.09.97)	US
60/057,764	5 September 1997 (05.09.97)	US
60/057,644	5 September 1997 (05.09.97)	US
60/057,765	5 September 1997 (05.09.97)	US
60/057,762	5 September 1997 (05.09.97)	US
60/057,775	5 September 1997 (05.09.97)	US
60/057,634	5 September 1997 (05.09.97)	US
60/057,777	5 September 1997 (05.09.97)	US
60/057,628	5 September 1997 (05.09.97)	US
60/057,776	5 September 1997 (05.09.97)	US
60/057,760	5 September 1997 (05.09.97)	US
60/057,761	5 September 1997 (05.09.97)	US
60/057,771	5 September 1997 (05.09.97)	US
60/057,770	5 September 1997 (05.09.97)	US
60/057,649	5 September 1997 (05.09.97)	US
60/057,774	5 September 1997 (05.09.97)	US
60/057,648	5 September 1997 (05.09.97)	US
60/057,642	5 September 1997 (05.09.97)	US
60/057,629	5 September 1997 (05.09.97)	US
60/057,778	5 September 1997 (05.09.97)	US
60/057,763	5 September 1997 (05.09.97)	US
60/057,584	5 September 1997 (05.09.97)	US
60/057,654	5 September 1997 (05.09.97)	US
60/057,646	5 September 1997 (05.09.97)	US
60/057,662	5 September 1997 (05.09.97)	US
60/057,650	5 September 1997 (05.09.97)	US
60/057,661	5 September 1997 (05.09.97)	US
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207 Human Secreted Proteins

Field of the Invention

This invention relates to newly identified polynucleotides and the polypeptides encoded by these polynucleotides, uses of such polynucleotides and polypeptides, and their production.

Background of the Invention

Unlike bacterium, which exist as a single compartment surrounded by a membrane, human cells and other eucaryotes are subdivided by membranes into many functionally distinct compartments. Each membrane-bounded compartment, or organelle, contains different proteins essential for the function of the organelle. The cell uses "sorting signals," which are amino acid motifs located within the protein, to target proteins to particular cellular organelles.

One type of sorting signal, called a signal sequence, a signal peptide, or a leader sequence, directs a class of proteins to an organelle called the endoplasmic reticulum (ER). The ER separates the membrane-bounded proteins from all other types of proteins. Once localized to the ER, both groups of proteins can be further directed to another organelle called the Golgi apparatus. Here, the Golgi distributes the proteins to vesicles, including secretory vesicles, the cell membrane, lysosomes, and the other organelles.

Proteins targeted to the ER by a signal sequence can be released into the extracellular space as a secreted protein. For example, vesicles containing secreted proteins can fuse with the cell membrane and release their contents into the extracellular space - a process called exocytosis. Exocytosis can occur constitutively or after receipt of a triggering signal. In the latter case, the proteins are stored in secretory vesicles (or secretory granules) until exocytosis is triggered. Similarly, proteins residing on the cell membrane can also be secreted into the extracellular space by proteolytic cleavage of a "linker" holding the protein to the membrane.

Despite the great progress made in recent years, only a small number of genes encoding human secreted proteins have been identified. These secreted proteins include the commercially valuable human insulin, interferon, Factor VIII, human growth hormone, tissue plasminogen activator, and erythropoeitin. Thus, in light of the pervasive role of secreted proteins in human physiology, a need exists for identifying and characterizing novel human secreted proteins and the genes that encode them. This knowledge will allow one to detect, to treat, and to prevent medical disorders by using secreted proteins or the genes that encode them.

Summary of the Invention

The present invention relates to novel polynucleotides and the encoded polypeptides. Moreover, the present invention relates to vectors, host cells, antibodies, and recombinant methods for producing the polypeptides and polynucleotides. Also provided are diagnostic methods for detecting disorders related to the polypeptides, and therapeutic methods for treating such disorders. The invention further relates to screening methods for identifying binding partners of the polypeptides.

Detailed Description

Definitions

The following definitions are provided to facilitate understanding of certain terms used throughout this specification.

In the present invention, "isolated" refers to material removed from its original environment (e.g., the natural environment if it is naturally occurring), and thus is altered "by the hand of man" from its natural state. For example, an isolated polynucleotide could be part of a vector or a composition of matter, or could be contained within a cell, and still be "isolated" because that vector, composition of matter, or particular cell is not the original environment of the polynucleotide.

In the present invention, a "secreted" protein refers to those proteins capable of being directed to the ER, secretory vesicles, or the extracellular space as a result of a signal sequence, as well as those proteins released into the extracellular space without necessarily containing a signal sequence. If the secreted protein is released into the extracellular space, the secreted protein can undergo extracellular processing to produce a "mature" protein. Release into the extracellular space can occur by many mechanisms, including exocytosis and proteolytic cleavage.

As used herein , a "polynucleotide" refers to a molecule having a nucleic acid sequence contained in SEQ ID NO:X or the cDNA contained within the clone deposited with the ATCC. For example, the polynucleotide can contain the nucleotide sequence of the full length cDNA sequence, including the 5' and 3' untranslated sequences, the coding region, with or without the signal sequence, the secreted protein coding region, as well as fragments, epitopes, domains, and variants of the nucleic acid sequence. Moreover, as used herein, a "polypeptide" refers to a molecule having the translated amino acid sequence generated from the polynucleotide as broadly defined.

In the present invention, the full length sequence identified as SEQ ID NO:X was often generated by overlapping sequences contained in multiple clones (contig

analysis). A representative clone containing all or most of the sequence for SEQ ID NO:X was deposited with the American Type Culture Collection ("ATCC"). As shown in Table 1, each clone is identified by a cDNA Clone ID (Identifier) and the ATCC Deposit Number. The ATCC is located at 10801 University Boulevard, Manassas, Virginia 20110-2209, USA. The ATCC deposit was made pursuant to the terms of the Budapest Treaty on the international recognition of the deposit of microorganisms for purposes of patent procedure.

A "polynucleotide" of the present invention also includes those polynucleotides capable of hybridizing, under stringent hybridization conditions, to sequences contained in SEQ ID NO:X, the complement thereof, or the cDNA within the clone deposited with the ATCC. "Stringent hybridization conditions" refers to an overnight incubation at 42° C in a solution comprising 50% formamide, 5x SSC (750 mM NaCl, 75 mM sodium citrate), 50 mM sodium phosphate (pH 7.6), 5x Denhardt's solution, 10% dextran sulfate, and 20 μg/ml denatured, sheared salmon sperm DNA, followed by washing the filters in 0.1x SSC at about 65°C.

Also contemplated are nucleic acid molecules that hybridize to the polynucleotides of the present invention at lower stringency hybridization conditions. Changes in the stringency of hybridization and signal detection are primarily accomplished through the manipulation of formamide concentration (lower percentages of formamide result in lowered stringency); salt conditions, or temperature. For example, lower stringency conditions include an overnight incubation at 37°C in a solution comprising 6X SSPE (20X SSPE = 3M NaCl; 0.2M NaH_2PO_4; 0.02M EDTA, pH 7.4), 0.5% SDS, 30% formamide, 100 ug/ml salmon sperm blocking DNA; followed by washes at 50°C with 1XSSPE, 0.1% SDS. In addition, to achieve even lower stringency, washes performed following stringent hybridization can be done at higher salt concentrations (e.g. 5X SSC).

Note that variations in the above conditions may be accomplished through the inclusion and/or substitution of alternate blocking reagents used to suppress background in hybridization experiments. Typical blocking reagents include Denhardt's reagent, BLOTTO, heparin, denatured salmon sperm DNA, and commercially available proprietary formulations. The inclusion of specific blocking reagents may require modification of the hybridization conditions described above, due to problems with compatibility.

Of course, a polynucleotide which hybridiz[illegible] as any 3' term[illegible]

complementary stretch of T (or U) residues, would not be included in the definition of "polynucleotide," since such a polynucleotide would hybridize to any nucleic acid molecule containing a poly (A) stretch or the complement thereof (e.g., practically any double-stranded cDNA clone).

The polynucleotide of the present invention can be composed of any polyribonucleotide or polydeoxribonucleotide, which may be unmodified RNA or DNA or modified RNA or DNA. For example, polynucleotides can be composed of single- and double-stranded DNA, DNA that is a mixture of single- and double-stranded regions, single- and double-stranded RNA, and RNA that is mixture of single- and double-stranded regions, hybrid molecules comprising DNA and RNA that may be single-stranded or, more typically, double-stranded or a mixture of single- and double-stranded regions. In addition, the polynucleotide can be composed of triple-stranded regions comprising RNA or DNA or both RNA and DNA. A polynucleotide may also contain one or more modified bases or DNA or RNA backbones modified for stability or for other reasons. "Modified" bases include, for example, tritylated bases and unusual bases such as inosine. A variety of modifications can be made to DNA and RNA; thus, "polynucleotide" embraces chemically, enzymatically, or metabolically modified forms.

The polypeptide of the present invention can be composed of amino acids joined to each other by peptide bonds or modified peptide bonds, i.e., peptide isosteres, and may contain amino acids other than the 20 gene-encoded amino acids. The polypeptides may be modified by either natural processes, such as posttranslational processing, or by chemical modification techniques which are well known in the art. Such modifications are well described in basic texts and in more detailed monographs, as well as in a voluminous research literature. Modifications can occur anywhere in a polypeptide, including the peptide backbone, the amino acid side-chains and the amino or carboxyl termini. It will be appreciated that the same type of modification may be present in the same or varying degrees at several sites in a given polypeptide. Also, a given polypeptide may contain many types of modifications. Polypeptides may be branched , for example, as a result of ubiquitination, and they may be cyclic, with or without branching. Cyclic, branched, and branched cyclic polypeptides may result from posttranslation natural processes or may be made by synthetic methods. Modifications include acetylation, acylation, ADP-ribosylation, amidation, covalent attachment of flavin, covalent attachment of a heme moiety, covalent attachment of a [illegible] nucleotide derivative, covalent attachment of a lipid or lipid derivative, [illegible] cross-linking, cyclization, disulfide bond

formation of pyroglutamate, formylation, gamma-carboxylation, glycosylation, GPI anchor formation, hydroxylation, iodination, methylation, myristoylation, oxidation, pegylation, proteolytic processing, phosphorylation, prenylation, racemization, selenoylation, sulfation, transfer-RNA mediated addition of amino acids to proteins such as arginylation, and ubiquitination. (See, for instance, PROTEINS - STRUCTURE AND MOLECULAR PROPERTIES, 2nd Ed., T. E. Creighton, W. H. Freeman and Company, New York (1993); POSTTRANSLATIONAL COVALENT MODIFICATION OF PROTEINS, B. C. Johnson, Ed., Academic Press, New York, pgs. 1-12 (1983); Seifter et al., Meth Enzymol 182:626-646 (1990); Rattan et al., Ann NY Acad Sci 663:48-62 (1992).)

"SEQ ID NO:X" refers to a polynucleotide sequence while "SEQ ID NO:Y" refers to a polypeptide sequence, both sequences identified by an integer specified in Table 1.

"A polypeptide having biological activity" refers to polypeptides exhibiting activity similar, but not necessarily identical to, an activity of a polypeptide of the present invention, including mature forms, as measured in a particular biological assay, with or without dose dependency. In the case where dose dependency does exist, it need not be identical to that of the polypeptide, but rather substantially similar to the dose-dependence in a given activity as compared to the polypeptide of the present invention (i.e., the candidate polypeptide will exhibit greater activity or not more than about 25-fold less and, preferably, not more than about tenfold less activity, and most preferably, not more than about three-fold less activity relative to the polypeptide of the present invention.)

Polynucleotides and Polypeptides of the Invention

FEATURES OF PROTEIN ENCODED BY GENE NO: 1

This gene is expressed primarily in melanocytes and, to a lesser extent, in testes, ovary, kidney and other tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, cancer, disorders of neural crest derived cells including pigmentation defects, melanoma, reproductive organ defects, and defects of the kidney. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the skin,

reproductive, and renal systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treating disorders that arise from alterations in the number or fate of neural crest derived cells including cancers such as melanoma and defects of the developing reproductive system.

FEATURES OF PROTEIN ENCODED BY GENE NO: 2

This gene is expressed primarily in infant brain and fetal lung.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, developmental disorders of the brain or lung. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the central nervous and pulmonary systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treating or diagnosing disorders associated with abnormal proliferation of cells in the Central nervous system and developing lung.

FEATURES OF PROTEIN ENCODED BY GENE NO: 3

This gene is expressed primarily in breast lymph node and to a lesser extent in ovarian cancer and chondrosarcoma.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immune responses such as inflammation or immune surveillance for

tumors. This gene may be important for inflammatory responses associated with tumors. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 236 as residues: Lys-45 to Val-50, Lys-69 to Arg-76.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment or diagnosis of immune responses including those associated with tumor-induced inflammation.

FEATURES OF PROTEIN ENCODED BY GENE NO: 4

This gene is expressed primarily in T-cells and T-cell lymphomas.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immunilogical diseases involving T-cells such as inflammation, autoimmunity, and cancers including T-cell lymphomas. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of T-cells and other cells of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosing and treating T-cell based disorders such as inflammatory diseases, autoimmune disease and tumors including T-cell lymphomas.

FEATURES OF PROTEIN ENCODED BY GENE NO: 5

This gene is expressed primarily in activated monocytes.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, inflammation, autoimmunity, infection, or disorders involving activation of monocytes. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 238 as residues: Asp-19 to Arg-31.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosing or treating diseases that result in activation of monocytes including infections, inflammatory responses or autoimmune diseases.

FEATURES OF PROTEIN ENCODED BY GENE NO: 6

The translation product of this gene shares sequence homology with terminal deoxynucleotidyltransferase which is thought to be important in catalyzing the elongation of oligo- or polydeoxynucleotide chains.

This gene is expressed primarily in activated human neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions which include, but are not limited to, cancer, particularly those of the blood such as leukemia and deficiencies in neutrophils such as neutropenia. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the cardiovascular system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., ---ous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial ... another tissue or cell sample taken from an individual having

such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to terminal deoxynucleotidyltransferase indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment and differential diagnosis of acute leukemia's. Alternatively, this gene may function in the proliferation of neutrophils and be useful as a treatment for neutropenia, for example, following neutropenia as a result of chemotherapy.

FEATURES OF PROTEIN ENCODED BY GENE NO: 7

The contig exhibits a reasonable homology to the human chorionic gonadotropic (HCG) analogue-GT beta-subunit as disclosed in U.S. Patent No. 5,508,261 and PCT Publication No. WO 92/22568. There is a high degree of conservation of the structurally important cysteine residues in these identities.

This gene is expressed primarily in IL-1 and LPS induced neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases of the immune system, including inflammatory diseases and allergies. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment/diagnosis of diseases of the immune system since expression is primarily in neutrophils, and may be useful as a growth factor for the differentiation or proliferation of neutrophils for the treatment of neutropenia following chemotherapy.

FEATURES OF PROTEIN ENCODED BY GENE NO: 8

This gene is expressed primarily in IL-1- and LPS-induced neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a

biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases of the immune system, including inflammatory diseases and allergies. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 241 as residues: Ser-14 to Pro-22, Leu-43 to Val-53.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment and diagnosis of diseases of the immune system since expression is primarily in neutrophils, and may be useful as a growth factor for the differentiation or proliferation of neutrophils for the treatment of neutropenia following chemotherapy.

FEATURES OF PROTEIN ENCODED BY GENE NO: 9

This gene is expressed primarily in IL-1 and LPS induced neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases of the immune system, including inflammatory diseases and allergies. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 242 as residues: Tyr-22 to His-35.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment/diagnosis of diseases of the immune system since expression is primarily in neutrophils, and may be useful as a growth

factor for the differentiation or proliferation of neutrophils for the treatment of neutropenia following chemotherapy.

FEATURES OF PROTEIN ENCODED BY GENE NO: 10

This gene is expressed primarily in activated T-cells and to a lesser extent in endothelial cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immune dysfunctions including cancer of the T lymphocytes and autoimmune disorders and inflammation. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment and diagnosis of immune disorders particularly of T-cell origin and may act as a growth factor for particular subsets of T-cells such as CD4 positive cells which would make this a useful therapeutic for the treatment of HIV and other immune compromising illnesses.

FEATURES OF PROTEIN ENCODED BY GENE NO: 11

This gene is expressed primarily in fetal tissue.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of many developmental abnormalities. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the developing fetus, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e.,

the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful as a growth factor or differentiation factor for particular cell types in the developing fetus and may be useful in replacement or other types of therapy in cases where the gene is expressed aberrantly.

FEATURES OF PROTEIN ENCODED BY GENE NO: 12

This gene is expressed primarily in T-cells and to a lesser extent in tumor tissue including glioblastoma, meningioma, and Wilm's tumor.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases of the immune system including autoimmune conditions such as rheumatoid arthritis, inflammatory disorders and cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 245 as residues: Thr-9 to Ser-14.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis/ modulation of immune function disorders, including rheumatoid arthritis and inflammatory responses.

FEATURES OF PROTEIN ENCODED BY GENE NO: 13

This gene is expressed primarily in placenta and to a lesser extent in fetal liver and bone marrow.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of hematological disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of

disorders of the above tissues or cells, particularly of the hematological and immune systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful as a growth factor for hematapoietic stem cells or progenitor cells in the treatment of chemotherapy patients or kidney disease.

FEATURES OF PROTEIN ENCODED BY GENE NO: 14

This gene is expressed primarily in stromal cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of hematapoietic disorders including cancer, neutropenia, anemia, and thrombocytopenia. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the hematapoietic and immune, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful as a growth factor for hematapoietic stem cells or progenitor cells, in particular following chemotherapy treatment.

FEATURES OF PROTEIN ENCODED BY GENE NO: 15

The translation product of this gene shares sequence homology with epsilon-COP from Bos taurus which is thought to be important as a component of coatomer, a complex of seven proteins, that is the major component of the non-clathrin membrane coat. Preferred polypeptides encoded by this gene comprise the following amino acid sequences:

MAPPAPGPASGGSGEVDELFDVKNAFYIGSYQQCINEAXXVKLSSPERDVERD

VFLYRAYLAQRKFGVVLDEIKPSSAPELQAVRMFADYLAHESRRDSIVAELDRE MSRSXDVTNTTFLLMAASIYLHDQNPDAALRALHQGDSLECTAMTVQILLKLD RLDLARKELKRMQDLDEDATLTQLATAWVSLATGGEKLQDAYYIFQEMADKCS PTLLLLNGQAACHMAQGRWEAAEGLLQEALDKDSGYPETLVNLIVLSQHLGKP PEVTNRYLSQLKDAHRSHPFIKEYQAKENDFDRLVLQYAPSAEAGPELSGP (SEQ ID NO:458); or RDVERDVFLYRAYLAQRKFGVVLDEIKPSSAPELQAVRMF ADYLAHESRRDSIVAELDREMSRSXDVTNTTFLLMAASIYLHDQNPDAALRALH QGDSLECTAMTVQILLKLDRLDLARKELKRMQDLDEDATLTQLATAWVSLATG GEKLQDAYYIFQEMADKCSPTLLLLNGQAACHMAQGRWEAAEGLLQEALDKD SGYPETLVNLIVLSQHLGKPPEVTNRYLSQLKDAHRSHPFIKEYQAKENDFDRL VLQYAPSA (SEQ ID NO:459).

This gene is expressed primarily in activated monocytes and T-cells, and to a lesser extent in multiple other tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immunomodulation, specifically relating to transport problems in these cells. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to epsilon-COP indicates that polynucleotides and polypeptides corresponding to this gene are useful for treating /diagnosing problems with the cellular transport of proteins that may result in immunologic dysfunction.

FEATURES OF PROTEIN ENCODED BY GENE NO: 16

The translation product of this gene shares sequence homology with an RNA helicase which is thought to be important in polynucleotide metabolism. The translation product of this contig exhibits good homology to the LbeIF4A antigen of Leishmania braziliensis. The LbeIF4A antigen, or immunogenic portions of it, can be used to induce protective immunity against leishmaniasis, specifically L. donovani, L. chagasi.

L. infantum. L. major, L. braziliensis, L. panamensis, L. tropica and L. guyanensis. It can also be used diagnostically to detect Leishmania infection or to stimulate a cellular and/or humoral immune response or to stimulate the production of interleukin-12.

This gene is expressed primarily in colon cancer and to a lesser extent in pituitary.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of cancers particularly of the colon. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the gastrointestinal system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 249 as residues: Glu-93 to Ala-98, Gln-150 to Leu-156, Leu-220 to Leu-231, Leu-268 to Arg-273, Val-324 to Pro-341, Arg-372 to Asn-380, Ser-405 to Gly-410, Phe-426 to Ala-433, Glu-458 to Asp-470, Arg-506 to Ser-547.

The tissue distribution and homology to RNA helicase indicates that polynucleotides and polypeptides corresponding to this gene are useful for development of diagnostic tests for colon cancer.

FEATURES OF PROTEIN ENCODED BY GENE NO: 17

The translation product of this contig has sequence homology to a cytoplasmic protein that binds specifically to JNK designated the JNK interacting protein-1 or JIP-1 in mice. JIP-1 caused cytoplasmic retention of JNK and inhibition of JNK-regulated gene expression.

This gene is expressed primarily in brain including pituitary cerebellum frontal cortex, fetal brain and to a lesser extent in the kidney cortex.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of the central nervous system disorders including ischemia, epilepsy, Parkinson's disease, and schizophrenia. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological

probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the central nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Furthermore, the translation product of this contig may suppress the effects of the JNK signaling pathway on cellular proliferation, including transformation by the Bcr-Abl oncogene. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 250 as residues: Pro-6 to Ser-26, Ala-30 to Asp-41, Gly-55 to Ser-61, Gly-74 to Thr-80, Tyr-117 to Ala-123, Tyr-167 to Asp-172, Ala-212 to Cys-223, Pro-239 to Tyr-244.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for enhanced survival and/or differentiation of neurons as a treatment for neurodegenerative disease.

FEATURES OF PROTEIN ENCODED BY GENE NO: 18

The translation product of this gene shares sequence homology with a liver stage antigen from a protozoan parasite.

This gene is expressed primarily in fetal tissue and to a lesser extent in activated T-cells and other immune cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, developmental abnormalities and diseases of immune function. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to a protozoan antigen indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment/immune modulation of parasitic infections.

FEATURES OF PROTEIN ENCODED BY GENE NO: 19

Preferred polypeptide encoded by this gene comprise the following polypeptide sequences:
MKAIGIEPSLATYHHIIRLFDQPGDPLKRSSFIIYDIMNELMGKRFSPKD
PDDDKFFQSAMSICSSLRDLELAYQVHGLLKTGDNWKFIGPDQHRNFYYSKFF
DLICLMEQIDVTLKWYEDLIPSAYFPHSQTMIHLLQALDVANRLEVIPKIWER
(SEQ ID NO:460); and/or KDSKEYGHTFRSDLREEILMLMARDKHPPELQVAF
ADCAADIKSAYESQPIRQTAQDWPATSLNCIAILFLRAGRTQEAWKMLGLFRKH
NKIPRSELLNELMDSAKVSNSPSQAIEVVELASAFSLPICEGLTQRVMSDFAINQ
EQKEALSNLTALTSDSDTDSSSDSDSDTSEGK (SEQ ID NO:461). Polynucleotides encoding such polypeptides are also provided.

This gene is expressed primarily in stromal and CD34 depleted bone marrow cells and to a lesser extent in tissues of embryonic origin.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases of hematologic origin including cancers and immune dysfunction. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the hematapoietic and immune, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 252 as residues: Ser-28 to Gln-34.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful as a growth factor for hematopoietic stem cells or progenitor cells which may be useful in the treatment of chemotherapy patients suffering from neutropenia.

FEATURES OF PROTEIN ENCODED BY GENE NO: 20

Preferred polypeptide fragments can be found in an alternative open reading frame. These preferred polypeptides comprise the amino acid sequence: MSSDNESDIEDEDLKLELRRLRDKHLKEIQDLQSRQKHEIESLYTKLGKVPPAVIIPPAAPLSGRRRRPTKSKGSKSSRSSSLGNKSPQLSGNLSGQSAASVLHPQQTLHPPGNIPESGQNQLLQPLKPSPSSDNLYSAFTSDGAISVPSLSAPGQGTSSTNTVGATVNSQAAQAQPPAMTSSRKGTFTDDLHKLVDNWARDAMNLSGRRGSKGHMNYEGPGMARKFSAPGQLCISMTSNLGGSAPISAASATSLGHFTKSMCPPQQYGFPATPFGAQWSGTGGPAPQPLGQFQPVGTASLQNFNISNLQKSISNPPGSNLRTT (SEQ ID NO:462); IQDLQSRQKHEIESLYTKLGKVPPAVIIPPAAPLSGRRRRPTKSKGSKSSRSSSLGNKSPQLSGNLSGQSAASVLHPQQTLHPPGNIPESGQNQLLQPLKPSPSSDNLYSAFTSDGAISVPSLSAPGQGTSST (SEQ ID NO:463); TSDGAISVPSLSAPGQGTSSTNTVGATVNSQAAQAQPPAMTSSRKGTFTDDLH (SEQ ID NO:464); KGHMNYEGPGMARKFSAPGQLCISMTSNLGGSAPISAASATSLGHFTK (SEQ ID NO:465); QPLKPSPSSDNLYSAFTSDGAISVPSLSAPG (SEQ ID NO:466). Also preferred are polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed in fetal liver and tissues associated with the CNS.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, liver and CNS diseases. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the liver and CNS, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 253 as residues: Gln-26 to Lys-34.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment for liver diseases such as hepatocellular carcinomas and diseases of the CNS.

FEATURES OF PROTEIN ENCODED BY GENE NO: 21

In an alternative reading frame, this gene shows sequence homology to two recently cloned genes, karyopherin beta 3 and Ran_GTP binding protein 5. (See Accession Nos. gi|2102696 and gnl|PID|e328731.) The Ran_GTP binding protein is related to importin-beta, the key mediator of nuclear localization signal (NLS)-dependent nuclear transport. Based on homology, it is likely that this gene may activity similar to the RAN_GTP binding protein. Preferred polypeptide fragments comprise the amino acid sequence: VRVAAAESMXLLLECAXVRGPEYLTQMWHFMCDALIKA IGTEPDSDVLSEIMHSFAK (SEQ ID NO:467). Also preferred are polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed in thymus tissue.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immune disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment for immune disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 22

This gene is expressed primarily in prostate and osteoclastoma tissues. Preferred polypeptide fragments also comprise the amino acid sequence: MEINNQNCFIVIDLVRTVMENGVEGLLIFGAFLPESWLIGVRCSSEPPKALLLIL AHSQKRRLDGWSFIRHLRVHYCVSLTIHFS (SEQ ID NO:468). Also preferred are polynucleotide sequences encoding this polypeptide fragment.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, bone and prostate diseases, and cancers, particularly of the bone and prostate. Similarly, polypeptides and antibodies directed to these polypeptides are

useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the bone and prostate systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 255 as residues: Met-1 to Ser-11.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment for bone and prostate disorders, especially cancers of those systems.

FEATURES OF PROTEIN ENCODED BY GENE NO: 23

This gene shares sequence homology with the FK506-binding protein (FKBP-13) family, a known cytosolic receptor for the immunosuppressants. Recently, another group has cloned a very similar gene, recognizing the homology to FK506-binding protein family, calling their gene FKBP23. (See Accession No. 2827255.)

This gene is expressed primarily in lymphoid tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample, especially for those susceptible to immune suppressant therapies and for diagnosis of diseases and conditions, which include, but are not limited to, immune suppressant disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 256 as residues: Ala-19 to Val-31, Arg-38 to Gly-49, Ala-61 to Lys-66, Tyr-68 to Pro-78, Gly-116 to Ala-121, Asp-154 to Ser-162, Glu-173 to Gln-186, Phe-194 to Gly-203. Pro-207 to Val-212.

The tissue distribution and homology to FKBP-12 and -13 indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment for immune suppressant disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 24

This gene is expressed primarily in the brain and in the retina. This gene maps to chromosome 8, and therefore can be used in linkage analysis as a marker for chromosome 8.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neurological and ocular associated disease states. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the disorders of the central nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 257 as residues: Cys-34 to Asp-40.

The tissue distribution in retina indicates that polynucleotides and polypeptides corresponding to this gene are useful for the treatment and/or detection of eye disorders including blindness, color blindness, impaired vision, short and long sightedness, retinitis pigmentosa, retinitis proliferans, and retinoblastoma. Expression in the brain indicates a role in the is useful for the detection/treatment of neurodegenerative disease states and behavioral disorders such as Alzheimer's Disease, Parkinson's Disease, Huntington's Disease, schizophrenia, mania, dementia, paranoia, obsessive compulsive disorder and panic disorder.

FEATURES OF PROTEIN ENCODED BY GENE NO: 25

This gene shows sequence homology to a newly identified class of proteins expressed in the nervous system, called stathmin family. (See Accession No. 2585991; see also Eur. J. Biochem. 248 (3), 794-806 (1997).) The stathmin family appears to be an ubiquitous phosphoprotein involved as a relay integrating various intracellular signaling pathways. These pathways affect cell proliferation and differentiation.

Preferred polypeptide fragments comprise the amino acid sequence: QDKHAEEVRKNKELKEEASR (SEQ ID NO:469); QQDLSPWAAPVGCPLXXASX TCHXLPLSGCLRRQSXSLPVVAXLCFWFSCPLASLFVPGQPCVTCPFPSLPFQD KHAEEVRKNKELKEEASR (SEQ ID NO:470). Also preferred are the polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed primarily in brain.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neurological disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the central nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the detection/treatment of neurodegenerative disease states and behavioral disorders such as Alzheimer's Disease, Parkinson's Disease, Huntintons Disease, schizophrenia, mania, dementia, paranoia, obsessive compulsive disorder and panic disorder.

FEATURES OF PROTEIN ENCODED BY GENE NO: 26

The polynucleotide sequence of this gene contains a domain similar to a Flt3 ligand peptide. Preferred polypeptide fragments comprise the amino acid sequence: PTRCCTTQPCRSSARRPCWVPMVPSPEGREXQPTCPS (SEQ ID NO:471). Thus, this gene may have activity as binding to Flt3 receptors, a process known to promote angiogenesis and/or lymphangiogenesis.

This gene is expressed in human tonsil, and to a lesser extent in teratocarcinoma, placenta, colon carcinoma, and fetal kidney.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases of the tonsil, as well as cancers, such as colon, reproductive, and kidney cancers. Similarly, polypeptides and antibodies directed to these polypeptides are useful

in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the tonsils, colon, reproductive organs, and kidneys, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 259 as residues: Pro-22 to Glu-33.

The tissue distribution in tonsil and several cancers and fetal tissues indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of diseases of the tonsil or colon, such as tonsillitis, inflammatory diseases involving nose and paranasal sinuses, especially during the infection of influenza, adenoviruses, parainfluenza, rhinoviruses. The gene may also be useful in the diagnosis and treatment of neoplasms of nasopharynx or colon origins.

FEATURES OF PROTEIN ENCODED BY GENE NO: 27

In an alternative reading frame exists a large open reading frame that encodes a preferred polypeptide. Preferred polypeptide fragments comprise the amino acid sequence: MKRSLNENSARSTAGCLPVPLFNQKKRNRQPLTSNPLKDDSGISTPSDNYDFP PLPTDWAWEAVNPEXAPVMKTVDTGQIPHSVSRPLRSQDSVFNSIQSNTGRSQ GGWSYRDGNKNTSLKTWXKNDFKPQCKRTNLVANDGKNSCPMSSGAQQQK QLRTPEPPNLSRNKETELLRQTHSSKISGCTMRGLDKNSALQTLKPNFQQNQY KXQMLDDIPEDNTLKETSLYQLQFKEKASSLRIISAVIESMKYWREHAQKTVLL FEVLAVLDSAVTPGPYYSKTFLMRDGKNTLPCVFYEIDRELPRLIRGRVHRCVG NYDQKKNIFQCVSVRPASVSEQKTFQAFVKIADVEMQYYINVMNET (SEQ ID NO:472); SQDSVFNSIQSNTGRSQGGWSYRDGNKNTSLKTWXKNDFKPQCKR (SEQ ID NO:473); NKETELLRQTHSSKISGCTMRGLDKNSALQTLKPNF (SEQ ID NO:474);SSLRIISAVIESMKYWREHAQKTVLLFEVLAVLDSAVTPGPYYSKTFLM (SEQ ID NO:475); and PRLIRGRVHRCVGNYDQKKNIFQCVSVRPASVSEQKT FQAFV (SEQ ID NO:476).

This gene is expressed primarily in human testes.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are

...uted to, male reproductive disorders, including cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the male reproductive system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful as a hormone with reproductive or other systemic functions; contraceptive development; male infertility of testicular causes, such as Kleinfelterís syndrome, varicocele, orchitis; male sexual dysfunctions; testicular neoplasms; and inflammatory disorders such as epididymitis.

FEATURES OF PROTEIN ENCODED BY GENE NO: 28

This gene is expressed primarily in apoptotic T-cell.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases relating to T cells, as well as cancer in general. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the disorders of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for immune disorders. Moreover, since the gene was isolated from an apoptotic cell and based on the understanding of the relationship of apoptosis and cancer, it is likely that this gene may play a role in the genesis of cancer.

FEATURES OF PROTEIN ENCODED BY GENE NO: 29

This gene is expressed primarily in human tonsils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, gastrointestinal disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the gastrointestinal system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis and treatment of gastrointestinal diseases.

FEATURES OF PROTEIN ENCODED BY GENE NO: 30

The translation product of this gene shares sequence homology with C44C1.2 gene product of Caenorhabditis elegans with unknown function. Preferred polypeptide fragments comprise the amino acid sequence: GVFRPCVCGRPASLTCSPLDPEVGPYCDTPTMRTLFNLLWLALACSPVHTTLSK SDAKKAASKTLLEKSQFSDKPVQDRGLVVTDLKAESVVLEHRSYCSAKARDRH FAGDVLGYVTPWNSHGYDVTKVFGSKFTQISPVWLQLKRRGREMFEVTGLHD VDQGWMRAVRKHAKGLHIVPRLLFEDWTYDDFRNVLDSEDEIEELSKTVVQVA KNQHFDGFVVEVWNQLLSQKRVGLIHMLTHLAEALHQARLLALLVIPPAITPGT DQLGMFTHKEFEQLAPVLDGFSLMTYDYSTAHQPGPNAPLSWVRACVQVLDP KXKWRTKSSWGSTSMXWTXRXPXDARXPVVGXRXIQXLKDHXPRMVLDSK PQ (SEQ ID NO:477); TCSPLDPEVGPYCDTPTMRTLFNLLWLALACSPVHTTLS (SEQ ID NO:478); LVVTDLKAESVVLEHRSYCSAKARDRHFAGDVLGYVTPW NSHGYDVTKVFGSKF (SEQ ID NO:479); REMFEVTGLHDVDQGWMRAVRK HAKGLHIVPRLLFEDWTYDDFRNVLDSEDE (SEQ ID NO:480); HFDGFVVEVW NQLLSQKRVGLIHMLTHLAEALHQARLLALLVIPPAITPGTDQLGM (SEQ ID NO:481); DGFSLMTYDYSTAHQPGPNAPLSWVRACVQVLDPKXKWRTKSSW GST (SEQ ID NO:482). Also preferred are polynucleotide fragments encoding these

polypeptide fragments. This gene maps to human chromosome 11, and therefore is useful in linkage analysis as a marker for chromosome 11.

This gene is expressed primarily in human T cells and to a lesser extent in human colon carcinoma.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immune disorders and cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune and gastrointestinal systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 263 as residues: Leu-21 to Ala-30, Ser-38 to Asp-47, Pro-87 to Asp-94, Leu-197 to Thr-204, Pro-256 to Ser-262, Thr-277 to Arg-282, Thr-293 to Trp-303.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis and treatment of immune disorders and gastrointestinal diseases.

FEATURES OF PROTEIN ENCODED BY GENE NO: 31

The translation product of this gene shares sequence homology with Ribosomal protein L11 of Caenorhabditis elegans. (See Accession No. 156201.) Preferred polypeptide fragments comprise the amino acid sequence:
ERGVSINQFCKEFNERTKDIKEGIPLPTKILVKPDRTFEIKIGQPTVSYFLKAAAG
IEKGARQTGKEVAGLVTLKHVYEIARIKAQDEAFALQDVPLSSVVRSIIGSARSL
GIRVVKDLSSEELAAF QKERAIFLAAQKEADLAAQEEAAKK (SEQ ID NO:483).
Also preferred are polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed in human embryo tissue and to a lesser extent in human epithelioid sarcoma and other tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, development disorders and epithelial cell cancer. Similarly, polypeptides and antibodies

directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the embryonic and epithelial cell systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 264 as residues: Lys-34 to Gly-40.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis and treatment of developmental disorders and epithelial cancer.

FEATURES OF PROTEIN ENCODED BY GENE NO: 32

This gene is expressed primarily in resting T cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, inflammatory and general immune disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis and treatment of disorders of immune system.

FEATURES OF PROTEIN ENCODED BY GENE NO: 33

This gene is believed to reside on chromosome 1. Accordingly, polynucleotides derived from this gene are useful in linkage analysis as chromosome 1 markers.

This gene is expressed primarily in prostate and to a lesser extent in soares adult brain, human umbilical vein endothelial cells, and amniotic cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, prostate-related disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the urinary system and nervous system expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that the protein products of this gene are useful for the diagnosis and treatment of disorders of the urinary and nervous systems.

FEATURES OF PROTEIN ENCODED BY GENE NO: 34

This gene shares sequence homology with R05G6.4 gene product. (See Accession No. gi|1326338.) This gene also shares sequence homology with the cyclophilin-like protein CyP-60. (See Accession No. 1199598, see also Biochem. J. 314 (1), 313-319 (1996).) Preferred polypeptide fragments comprise the amino acid sequence: AVYTYHEKKKDTAASGYGTQNIRLSRDAVKDFDCCCLSLQPCHDPVVTPDGYL YEREAILEYILHQKKEIARQMKAYEKQRGTRREEQKELQRAASQDHVRGFLEKE SAIVSRP LNPFTAKALSGTSPDDVQPGPSVGPPSKDKDKVLPSFWIPSLTPEAK ATKLEKPSRTVTCPMSGKPLRMSDLTPVHFTPLDSSVDRVGLITRSERYVCAVT RDSLSNATPCAVLRPSGAVVTLECVEKLIRKDMVDPVTGDKLTDRDIIVLQRGT (SEQ ID NO:484); YLYEREAILEYILHQKKEIARQMKAYEKQRGTRREEQKELQ RAASQDHVRGFLE (SEQ ID NO:485); and FTAKALSGTSPDDVQPGPSVGPP SKDKDKVLPSFWIPSLTPEAKATKLEKPSRTVTCPMSGKPL (SEQ ID NO:486). Also preferred are polynucleotide fragments that encode these polypeptide fragments.

This gene is expressed primarily in human testis and to a lesser extent in other tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, male reproductive disorders and in particular testicular cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing

immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system. Expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma. urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of disorders of the male reproductive system and in particular of testicular cancer.

FEATURES OF PROTEIN ENCODED BY GENE NO: 35

The translation product of this gene shares sequence homology with Lpe5p of Saccharomyces cerevisiae which is thought to be important in the metabolism of phospholipids.

This gene is expressed primarily in liver and brain.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, metabolic disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the metabolic and nervous systems expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 268 as residues: Pro-14 to Leu-20, Lys-28 to Asn-38, Arg-109 to Arg-114, Lys-119 to Asn-124, Glu-152 to Leu-157, Pro-172 to Val-180.

The tissue distribution and homology to Lpe5p of Saccharomyces cerevisiae indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis and treatment of metabolic and nervous disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 36

This gene shares sequence homology with the nuclear ribonucleoprotein U (HNRNP U), encoded by *C. elegans* (See Accession gil1703576.) Preferred polypeptide fragments comprise the amino acid sequence: MDTSENRPENDVPEPPMPIADQVSNDDRPEGSVEDEEKKESSLPKSFKRKISVVSATKGVPAGNSDTEGGQPGRKRRWGASTATTQKKPSISITTESLKSLIPDIKPLAGQEAVVDLHADDSRISEDETERNGDDGTHDKGLKICRTVTQVVPAEGQENGQREEEEEEKEPEAEPPVPPQVSVEVALPPPAEHEVKKVTLGDTLTRRSISQQKSGVSITIDDPVRTAQVPSPPRGKISNIVHISNLVRPFTLGQLKELLGRTGTLVEEAFWIDKIKSHCFVTYSTVEEAVATRTALHGVKWPQSNPKFLCADYAEQDELDYHRGLLVDRPSETKTEEQGIPRPLHPPPPPPVQPPQHPRAEQREQERAVREQWAEREREMERRERTRSEREWDRDKVREGPRSRSRSRXRRRKERAKSKEKKSEKKEKAQEEPPAKLLDDLFRKTKAAPCIYWLPLTDSQIVQKEAERAERAKEREKRRKEQEEEEQKEREKEAERERNRQLEREKRREHSRERDRERERERDRGDRDRDRERDRERGRERDRRDTKRHSRSRSRSTPVRDRGGR (SEQ ID NO:488). Also preferred are the polynucleotide fragments encoding this polypeptide fragments.

This gene is expressed primarily in epididymus.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases of the male reproductive system. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the male reproductive system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis and treatment of male reproductive disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 37

This gene is expressed primarily in amygdala.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, inflammatory diseases and reproductive disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the amygdala, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of inflammatory diseases and reproductive disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 38

This gene shares sequence homology with human opsonin protein P35 fragment. (See Accession No. R94181.) The opsonin protein activates the phagocytosis of pathogenic microbes by phagocytic cells. Preferred polypeptide fragments comprise the amino acid sequence: GCDSCPPHLPREAFAQDTQAEGECSSRAERADMCPDAP PSQEVPEGPGAAP (SEQ ID NO:489). Also preferred are polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed in immune-related tissues such as thymus, macrophage, T cells and to a lesser extent in many other tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immune disorders and infectious disease. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system and infectious disease, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e.,

the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 271 as residues: Lys-9 to Arg-14, Met-38 to Asp-51.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of immune disorders, as well as the treatment and/or diagnosis of infectious disease.

FEATURES OF PROTEIN ENCODED BY GENE NO: 39

The translation product of this gene shares sequence homology with alpha-2 type I collagen which is thought to be important in tissue repair. (See, e.g., 211607.) Preferred polypeptide fragments comprise the amino acid sequence: PQLPSCGRPW PGTASVFQSHTQGPREDPDPCRAQGSAGTHCPISLSPPRQ (SEQ ID NO:490). Also preferred are the polynucleotide sequences encoding these polypeptide sequences.

This gene is expressed primarily in the brain and to a lesser extent in the kidney and thymus

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, brain, kidney, and immune disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the brain, kidney, and immune disorders, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to alpha-2 type I collagen indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of tissue repair, and brain, kidney, immune disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 40

The translation product of this gene shares sequence homology with mini-collagen which is thought to be important in tissue repair tumor metastasis. (See Accession No. gnl|PID|d1006976.) Preferred polypeptide fragments comprise the amino acid sequence: PGFRGPSGSLGCSFFPRSLGRVLPPGCQRPGAHAD

SSPPPTP (SEQ ID NO:491). Also preferred are polynucleotides encoding this polypeptide fragment.

This gene is expressed in ovarian cancer and to a lesser extent in dedritic cells and smooth muscle.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, tumor metastasis and tissue repair. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the tumor metastasis and tissue repair, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 273 as residues: Asn-2 to His-11.

The tissue distribution and homology to mini-collegen gene indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of tumor metastasis and tissue repair.

FEATURES OF PROTEIN ENCODED BY GENE NO: 41

This gene shares sequence homology with the HIV TAT protein. (See Accession No. 328416.) Preferred polypeptide fragments comprise the amino acid sequence: EDLKKPDPASLRAASCGEGKKRKACKNCTCGLAEELEKEK SREQMSSQPKSACGNCYLGDAFRCASCPYLGMPAFKPGEKVLLS (SEQ ID NO:492); EDLKKPDPASLRAASCGEGKKRKACKNCTCGLAEELEKEK SREQMSSQPKSACGNCYLGDAFRCASCPYLGMPAFKPGEKVLLSDSNLHD (SEQ ID NO:493); CGNCYLGDAFRCASCPYLGMPAFKPGEKVLLSDS (SEQ ID NO:494); SCGEGKKRKACKNCTCGLAEELEKE (SEQ ID NO:495); SQPKSAC GNCYLGDAFRCASC (SEQ ID NO:496); and REAGQNSERQYVS LSRD (SEQ ID NO:497). Also preferred are polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed primarily in the infant brain and to a lesser extent in the breast and testes.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, brain, testes and breast disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the brain, testes and breast disorders, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 274 as residues: Pro-7 to Val-15.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of brain, testes and breast, and other related disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 42

This gene is expressed primarily in the infant brain, human cerebellum, and to a lesser extent in medulloblastoma.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, brain related disorders and medulloblastoma and other brain cancers. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the brain related disorders and brain cancers, including medulloblastoma, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 275 as residues: Thr-41 to Glu-47.

FEATURES OF PROTEIN ENCODED BY GENE NO: 44

This gene is expressed primarily in the fetal brain. cerebellum and to a lesser extent in the placenta.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neuronal cell related disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the neuronal cell related disorders, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 277 as residues: Thr-20 to Gly-28.

The tissue distribution and homology to proline-rich protein genes indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of neuronal cell related disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 45

The translation product of this gene shares sequence homology with precerebellin of human, which is thought to be important in synaptic physiology. (See Accession No. gi|180251.) It has been observed that cerebellin-like immunoreactivity is associated with Purkinje cell postsynaptic structures. Thus, it is likely that this gene also have synaptic activity. Preferred polypeptide fragments comprise the amino acid sequence: QEGSEPVLLEGECLVVCEPGRAAAGGPGGAALGEAPPGRVAFXAV RSHHHEPAGETGNGTSGAIYFDQVLVNEGGGFDRASGSFVAPVRGVYSFRFH VVKVYNRQTVQVSLMLNTWPVISAFANDPDVTREAATSSVLLPLDPGDRVSLR LRRGXSTGW (SEQ ID NO:499). Also preferred are polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed primarily in cerebellum and infant brain. By Northern analysis, a single transcript of 2.4 kb was observed in brain tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of human brain related disorders, brain cancers, and medulloblastoma.

FEATURES OF PROTEIN ENCODED BY GENE NO: 43

The translation product of this gene shares sequence homology with a phosphotyrosine-independent ligand for the lck SH2 domain which is thought to be important in signal transduction related to phosphotyrosine-independent ligand for the lck SH2 domain. (See Accession No. gi|1184951.) Preferred polypeptide fragments comprise the amino acid sequence: ESSGQARTLADPGPGWPRQQGMCFGSLT GLSTTPHGFLTVSAEADPRLIESLSQMLSMGFSDEGGWLTRLLQTKNYDIGAAL DTIQYSKH (SEQ ID NO:498). Also preferred are polynucleotide fragments encoding this polypeptide fragment. It is likely that this gene is a new member of a family of phosphotyrosine-independent ligands for the lck SH2 domains.

This gene is expressed primarily in the placenta and to a lesser extent in endothelial cells and neutrophil.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, reproductive, cardiovascular, immune, and infectious diseases. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the cardiovascular, reproductive, and immune system, and infectious diseases, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to a phosphotyrosine-independent ligand for the lck SH2 domain indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of cardiovascular, reproductive, and immune system diseases, as well as infectious diseases.

FEATURES OF PROTEIN ENCODED BY GENE NO: 47

The translation product of this gene shares sequence homology with a 12 kD nucleic acid binding protein of Feline calcivirus which is thought to be important in viral replication. (See Accession No. 59264)

This gene is expressed primarily in human cardiomyopathy and to a lesser extent in T helper cells, fetal brain and synovial sarcoma.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, cardiomyopathy as well as viral infection. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the cardiovascular system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 280 as residues: Trp-20 to Cys-26.

The tissue distribution in cardiomyopathy and homology to viral 12 kD nucleic acid binding protein indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and intervention of cardiomyopathy, including those caused by ischemic, hypertensive, congenital, valvular, or pericardial abnormalities. The gene expression pattern may be the consequence or the cause for these conditions.

FEATURES OF PROTEIN ENCODED BY GENE NO: 48

The translation product of this gene shares sequence homology with tumor necrosis factor related gene product which is thought to be important in tumor necrosis, bacterial and viral infection, immune diseases and immunoreactions.

This gene is expressed primarily in colon and to a lesser extent in ovarian and breast cancers.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, tumors of colon, ovary or breast origins. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes

not limited to, neuronal cell signal transduction and synaptic physiology. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the neuronal cell signal transduction and synaptic physiology expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to gene or gene family indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of neuronal cell related disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 46

This gene is expressed in fetal liver and spleen, and to a lesser extent in bone marrow, umbilical vein, and T cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, disorders of the immune system, particularly hematopoiesis. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the hematopoiesis and immune disorders, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 279 as residues: Asp-30 to Glu-57..

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of hematopieotic and immune disorders.

for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the colon. ovary and breast, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to Tumor necrosis factors indicates that polynucleotides and polypeptides corresponding to this gene are useful for intervention of cancers of colon, ovary and breast origins, because TNF family members are known to be involved in the tumor development.

FEATURES OF PROTEIN ENCODED BY GENE NO: 49

The translation product of this gene shares sequence homology with mucins, such as epithelial mucin, which is thought to be important in extracellular matrix functions such as protection, lubrication and cell adhesion (See for example Accession No. R68002). Preferred polypeptide fragments comprise the following amino acid sequence: PRSRPALRPGRQRPPSHSATSGVLRPRKKPDP (SEQ ID NO:500). Also preferred are polynucleotide fragments encoding these polypeptide fragments. Moreover, this gene maps to chromosome 22q11.2-qter, and therefore, can be used as a marker in linkage analysis for chromosome 22.

This gene is expressed primarily in corpus colosum.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, tumors, especially of corpus colosum, as well as metastatic lesions. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the corpus colosum and other solid tissues, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to mucins indicates that polynucleotides and polypeptides corresponding to this gene are useful for serum tumor markers or immunotherapy targets because tumor cells have greatly elevated level of mucin expression and shed the molecules into the epithelial tissues.

FEATURES OF PROTEIN ENCODED BY GENE NO: 50

This gene is expressed primarily in CD34 depleted buffy coat cord blood and primary dendritic cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, hematopoietic disorders and immunological disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the hematopoietic and immune systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution in CD34 depleted buffy coat cord blood and primary dendritic cells indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of hematopoietic and immune disorders. Secreted or cell surface proteins in the above tissue distribution often are involved in cell activation (e.g. cytokines) or molecules involved in cell surface activation.

FEATURES OF PROTEIN ENCODED BY GENE NO: 51

The translation product of this gene shares sequence homology with Interferon induced 1-8 gene encoded polypeptide which is thought to be important in binding to retroviral rev responsive element. Preferred polypeptide fragment comprise the following amino acid sequences: MTLITPSXKLTFXKGNKSWSSRACSSTLVDP (SEQ ID NO:501). Also preferred are polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed primarily in CD34 positive cells and neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a

biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, retroviral infection, such as AIDS, and other immune disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 284 as residues: Gln-51 to Trp-62.

The tissue distribution and homology to interferon induced gene 1-8 indicates that polynucleotides and polypeptides corresponding to this gene are useful for intervention of retroviral infection including HIV. The factor may be involved in viral stability or viral entry into the cells. Alternatively, the virus/factor complex may elicit the cellular immune reaction.

FEATURES OF PROTEIN ENCODED BY GENE NO: 52

This gene shares sequence homology to immunoglobulin lambda chain (See Accession No. 2865484). Therefore it is likely that this gene has activity similar to an immunoglobulin lambda chain. Preferred polypeptide fragments comprise the following amino acid sequence: GHPSPALSIAPSDGSQLPCDEVPYGEAHVTRYCKKPLTNS HLETEAQSSSL (SEQ ID NO:502). Also preferred are polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed primarily in Hodgkin's lymphoma.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, Hodgkin's lymphoma and other immune disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e.,

the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 285 as residues: Pro-27 to Thr-32.

The tissue distribution in Hodgkin's lymphoma and the sequence homology indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis of Hodgkin's lymphoma, since the elevated expression and secretion by the tumor mass may be indicative of tumors of this type. Additionally the gene product may be used as a target in the immunotherapy of the cancer.Because the gene is expressed in cells of lymphoid origin, the natural gene product may be involved in immune functions. Therefore it may be also used as an agent for immunological disorders including arthritis, asthma, immune deficiency diseases such as AIDS, and leukemia.

FEATURES OF PROTEIN ENCODED BY GENE NO: 53

This gene has extensive homology to cDNA for Homo sapiens mRNA for the ISLR gene(See Accession No. AB003184). This protein is considered to be a new member of the Ig superfamily and contains a leucine-rich repeat (LRR) with conserved flanking sequences and a C2-type immunoglobulin (Ig)-like domain. These domains are important for protein-protein interaction or cell adhesion, and therefore it is possible that the novel protein ISLR may also interact with other proteins or cells. The ISLR gene was mapped on human chromosome 15q23-q24 by fluorescence in situ hybridization (See Medline Article No. 97468140). Homology to the ISLR gene has been confirmed by another independent group as well (See Accession No. Hs.102171)

This gene is expressed in a number of tissues including human retina, heart, skeletal muscle, prostate, ovary, small intestine, thyroid, adrenal cortex, testis, stomach, spinal cord, fetal lung and fetal kidney tissues, colon, tonsil and stomach cancer, and to a lesser extent in endometrial stromal cells treated with estradiol, breast tissue, synovium, lymphoma, and number of other tumors.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, tumors of colon, ovary and breast origins. However, due to the wide range of expression in various tissues, protein may play a vital role in the development of cancer in other tissues as well, not just those mentioned above. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the colon, ovary and breast, expression of this gene at significantly higher or lower levels may be routinely

detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Additionally, this gene maps to chromosome 15q23-q24, and therefore, can be used as a marker in linkage analysis for chromosome 15.

The tissue distribution in tumors of colon, ovary, and breast origins indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and intervention of these tumors, in addition to other tumors where expression has been indicated. Protein, as well as, antibodies directed against the protein may show utility as a tumor marker and/or immunotherapy targets for the above listed tumors and tissues.

FEATURES OF PROTEIN ENCODED BY GENE NO: 54

Gene has homology to multidrug resistance gene 1 (See Accession No. P06795). Preferred polynucleotide fragments comprise the following sequence: GCTTCGTGTCCAACCCTCTTGCCCTTCGCCTGTGTGCCTGGAGCCAGTCCCA CCACGCTCGCGTTTCCTCCTGTAGTGCTCACAGGTCCCAGCACCGATGGCA TTCCCTTTGCCCTGAGTCTGCAGCGGGTCCCTTTTGTGCTTCCTTCCCCTCA GGTAGCCTCTCTCCCCCTGGGCCACTCCCGGGGGTGAGGGGGTTACCCCTT CCCAGTGTTTTTTATTCCTGTGGGGCTCACCCCAAAGTATTAAAAGTAGCTTT GTAA (SEQ ID NO:503). Also preferred are polypeptide fragments encoded by these polynucleotide fragments.

This gene is expressed primarily in lung, esophagus, leukemia (Jurkat cells) and breast cancers and to a lesser extent in macrophages treated with GM-CSF fetal tissues and wide range of tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions which include, but are not limited to, cancer of wide range of origins. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the solid tumors, lung and leukemia, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e.,

the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Furthermore, due to the high expression level in lung tissue and the proposed function of the multidrug resistance protein 1 gene as the efflux pump responsible for low-drug accumulation in multidrug-resistant cells, protein as well mutants thereof, may also be beneficial as a target for gene therapy, particularly for the chronic patient. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 287 as residues: Met-1 to Lys-16.

The tissue distribution in wide range of cancers and fetal tissues indicates that polynucleotides and polypeptides corresponding to this gene are useful for detection of cells in active proliferation, such as cancers. The gene products may be used for cancer markers or immunotherapy target.

FEATURES OF PROTEIN ENCODED BY GENE NO: 55

This gene maps to the X chromosome.

This gene is expressed primarily in the brain and to a lesser extent in the developing embryo.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neurodegenerative disease states and developmental disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders, including sex-linked disorders, of the above tissues or cells, particularly of the neurological, developmental systems, and cardiovascular system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Moreover, this gene maps to the X chromosome, and therefore, may be used as a marker in linkage analysis for this chromosome.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the detection/treatment of neurodegenerative disease states and behavioral disorders such as Alzheimer's Disease, Parkinson's Disease, Huntington's Disease, Klinefelter's, schizophrenia, mania, dementia, paranoia, obsessive compulsive disorder and panic disorder. In addition, the gene or gene product may also play a role in the treatment and/or detection of developmental

disorders associated with the developing embryo, sexually-linked disorders, or disorders of the cardiovascular system.

FEATURES OF PROTEIN ENCODED BY GENE NO: 56

The translation product of this gene shares sequence homology with paxillin which is thought to be important in mediating signal transduction from growth factor receptors to the cytoskeleton. Preferred polynucleotide fragments comprise the following sequence: TGGCTCACTGTCTTACAATCACTGCTGTGGAATCATGA TACCACTTTTAGCTCTTTGCATCTTCCTTCAGTGTATTTTTGTTTTTCAAGAGG AAGTAGATTTTAACTGGACAACTTTGAGTACTGACATCATTGATAAATAAACT GGCTTGTGGTTTCAA (SEQ ID NO:506). Also preferred are polypeptide fragments encoded by these polynucleotide fragments. More preferably, polypeptide fragments comprise the amino acid sequence: LDELMAHLTEMQAKVAVRAD AGKKHLPDKQDHKASLDSMLGGLEQELQDLGIATVPKGHCASCQKPIAGKVI HALGQSWHPEHFVCTHCKEEIGSSPFFERSGLXYCPNDYHQLFSPRCAYCAAP ILDKVLTAMNQTWHPEHFFCSHCGEVFGAEGFHEKDKKPYCRKDFLAMFSPK CGGCNRPVLENYLSAMDTVWHPECFVCGDCFTSFSTGSFFELDGRPFCELHYH HRRGTLCHGCGQPITGRCISAMGYKFHPEHFVCAFCLTQLSKGIFREQNDKTY CQPCFNKLF (SEQ ID NO:507); KASLDSMLGGLEQELQDLGIATVPKGHC ASCQKPIAGKVIHAL (SEQ ID NO:508); CPNDYHQLFSPRCAYCAAPILDKVL TAMNQTWHPEHFFCSHCGEVFGAEG (SEQ ID NO:509); DKKPYCRKDFLAM FSPKCGGCNRPVLENYLSAMDTVWHPECFVCGDCFTSFSTGSFFELDGRPFCE L (SEQ ID NO:510); CGQPITGRCISAMGYKFHPEHFVCAFCLTQLSKGIFRE QNDKTYCQ (SEQ ID NO:511). Polynucleotide fragments encoding these preferred polypeptide fragments are also contemplated.

This gene is expressed primarily in brain, and to a lesser extent in the developing embryo.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neurological disease states and developmental abnormalities. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune and nervous systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or

cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Moreover, since this gene shares homology with a gene that maps to chromosome 11, (See Accession No.T87404), gene as well as its translated product may be used for linkage analysis on chromosome 11.

The tissue distribution and homology to paxillin indicates that polynucleotides and polypeptides corresponding to this gene are useful for the treatment and or detection of disease states associated with abnormal signal transduction in brain and/or the developing embryo. This would include treatment or detection of neurodegenerative disease states and behavioral disorders such as Alzheimer's Disease, Parkinson's Disease, Huntingtons Disease, schizophrenia, mania, dementia, paranoia, obsessive compulsive disorder and panic disorder and also in the treatment and or detection of embryonic development defects.

FEATURES OF PROTEIN ENCODED BY GENE NO: 57

This gene is expressed primarily in fetal spleen, brain, and to a lesser extent in six week old embryo.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immune disorders, neurological disorders, and developmental abnormalities. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune and developmental systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 290 as residues: Arg-28 to Gly-34.

The expression of this gene in fetal spleen indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment/detection of immune disorders such as arthritis, asthma, immune deficiency diseases such as AIDS, and leukemia. In addition the expression of this gene in the early embryo, indicates a key role in embryo development and hence the gene or gene product could be used in the treatment and or detection of embryonic development defects. This would include

treatment or detection of neurodegenerative disease states and behavioral disorders such as Alzheimer's Disease, Parkinson's Disease, Huntintons Disease, schizophrenia, mania, dementia, paranoia, obsessive compulsive disorder and panic disorder and also in the treatment and or detection of embryonic development defects.

FEATURES OF PROTEIN ENCODED BY GENE NO: 58

The translation product of this gene shares sequence homology with the gene disrupted in the neurodegenerative disease dentatorubal-pallidoluysian atrophy. Moreover a long open reading fame exists in an alternative frame. Preferred polypeptide fragments comprise the following: MGSSQSVEIPGGGTEGYHVLRVQENSPGHRAGLEPFFDFIVSINGSRLNKDND TLKDLLKXNVEKPVKMLIYSSKTLELRETSVTPSNLWGGQGLLGVSIRFCSFD GANENVWHVLEVESNSPAALAGLRPHSDYIIGADTVMNESEDLFSLIETHEAKP LKLYVYNTDTDNCREVIITPNSAWGGEGSLGCGIGYGYLHRIPTRPFEEGKKIS LPGQMAGTPITPLKDGFTEVQLSSVNPPSLSPPGTTGIEQSLTGLSISSTPPAVSS VLSTGVPTVPLLPPQVNQSLTSVPPMNPATTLPGLMPLPAGLPNLPNLNLNLPA PHIMPGVGLPELVNPGLPPLPSMPPRNLPGIAPLPLPSEFLPSFPLVPESSSAASS GELLSSLPPTSNAPSDPATTTAKADAASSLTVDVTPPTAKAPTTVEDRVGDSTPV SEKPVSAAVDANASESP (SEQ ID NO:512); SVEIPGGGTEGYHVLRVQENSPGH RAGLEPFFDFIVSINGSRLNKDNDTLKDLLKXNVEKPVKMLIYSSKTLELRETS VTPSNLWGGQGLLGVSIRFCSFDGANENVWH (SEQ ID NO:513); ESNSPAA LAGLRPHSDYIIGADTVMNESEDLFSLIETHEAKPLKLYVYNTDTDNCREVIITP NSAWGGEGSLGCGIGYGYLHRIPTRPFEEGKKISLPGQMAGTPITPLKDGFTEV QLSSVNPPSLSPPGTTGIEQSLTG LSISS (SEQ ID NO:514); RIPTRPFEEGKKI SLPGQMAGTPITPLKDGFTEVQLSSVNPPSLSPPGTTGIEQSLTGLSISSTPPAVS SVLSTGVPTVPLLPPQVNQSLTSVPPMNPATTLPGLMPLPAGLPNLPNLNLNLP APHIMPGVGLPELVNPGLPPLPSMPPRN (SEQ ID NO:516); PGLPPLPSMPPRN LPGIAPLPLPSEFLPSFPLVPESSSAASSGELLSSLPPTSNAPSDPATTTAKADAA SSLTVDVTPPTAKAPTTVEDRVGDSTPVSEKPVSAAVDAN (SEQ ID NO:517).

This gene is expressed primarily in prostate cancer, and to a lesser extent in the pineal glands and in fetal lung.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neurological conditions and pulmonary disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For

a number of disorders of the above tissues or cells, particularly of the nervous, pulmonary, and endocrine systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 291 as residues: Asn-9 to Leu-14.

The abundance of this gene in the pineal gland and its homology to a gene disrupted in the neurodegenerative disease state Dentatorubral-pallidoluysian atrophy indicates that this gene may be useful in the treatment and/or detection of other neurodegenerative disease states and behavioral disorders such as Alzheimer's Disease, Parkinson's Disease, Huntingtons Disease, schizophrenia, mania, dementia, paranoia, obsessive compulsive disorder and panic disorder. The abundance of this gene in fetal lung would suggest that misregulation of the expression of this protein product in the adult could lead to lymphoma or sarcoma formation, particularly in the lung; that it may also be involved in predisposition to certain pulmonary defects such as pulmonary edema and embolism, bronchitis and cystic fibrosis; and thus the gen or the gene protein encoded by the gene could be used in the detection and/or treatment of these pulmonary disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 59

This gene is expressed primarily in the developing embryo.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, developmental abnormalities. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the developmental system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The expression of this gene primarily in the embryo, indicates the gene plays a key role in embryo development and that the gene or the protein encoded by the gene could be used in the treatment and or detection of developmental defects in the embryo or in infants.

FEATURES OF PROTEIN ENCODED BY GENE NO: 60

This gene displays homology to nestin, an intermediate filament protein, the expression of which correlates with the proliferation of Central Nervous System progenitor cells and that is useful in the identification of brain tumors. This gene maps to chromosome 1, and therefore, may be used as a marker in linkage analysis for chromosome 1 (See Accession No. AA527348).

This gene is expressed primarily in kidney and to a lesser extent in brain.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, renal disorders and neurodegenerative conditions. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the excretory and nervous systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 293 as residues: Thr-128 to Asn-135.

The tissue distribution and homology to nestin indicates that polynucleotides and polypeptides corresponding to this gene are useful for detection and/or treatment of neurodegenerative disease states and behavioral disorders such as Alzheimer's Disease, Parkinson's Disease, Huntingtons Disease, schizophrenia, mania, dementia, paranoia, obsessive compulsive disorder and panic disorder. In addition, its abundance in kidney indicates that it is useful in the treatment and detection of acute renal failure and other disease states associated with the kidney.

FEATURES OF PROTEIN ENCODED BY GENE NO: 61

Gene shares homology with the latrophilin-related protein 1 precursor as well as the calcium-independent alpha-latrotoxin receptor. Preferred polypeptide fragments

comprise the following amino acid sequence:
IYKVFRHTAGLKPEVSCFENIRSCARXXXXXXXXXXXXWIFGVLHVVHASVVTAYLFTVSNAFQGMFIFLFLCVLSRKIQEEYYRLFKNVPCC (SEQ ID NO:518); WIFGVLHVVHASVVTAYLFTVSNAFQGMFIFLFLCVLSRKIQEEYYRLFKNVPCC (SEQ ID NO:519). Also preferred are polynucleotide fragments encoding these polypeptide fragments. (See Accession No. 2213659) The translation product of this gene shares sequence homology with CD 97, a seven transmembrane bound receptor.

This gene is expressed primarily in infant brain and in endothelial cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neurological disorders and hematopoeitic disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the neurological and hematopoeitic systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 294 as residues: Lys-13 to Leu-21.

The tissue distribution of this gene suggest that it may be useful in the detection and/or treatment of neurodegenerative disease states and behavioral disorders such as Alzheimer's Disease, Parkinson's Disease, Huntingtons Disease, schizophrenia, mania, dementia, paranoia, obsessive compulsive disorder and panic disorder, while its expression in hematopoietic cell types indicates that the gene could be important for the treatment or detection of immune or hematopoietic disorders including arthritis, asthma and immunodeficiency diseases.

FEATURES OF PROTEIN ENCODED BY GENE NO: 62

This gene is expressed primarily in fetal liver and fetal spleen.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, hematological and immunological disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes

for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune and hematopoetic systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 295 as residues: Ser-91 to Lys-98.

The tissue distribution of this gene fetal liver and spleen indicates that the gene could be important for the treatment or detection of immune or hematopoietic disorders including arthritis, leukemia, asthma and immunodeficiency diseases.

FEATURES OF PROTEIN ENCODED BY GENE NO: 63

Gene shares homology with human serum amyloid protein. Preferred polypeptide fragments comprise the following amino acid sequence: ALTRIPPGDWVINVTAVSFAGKTTARFFHSSPPSLGDQARTDPGHQRRD (SEQ ID NO:520) (See Accession No. W13671). Also preferred are polynucleotide fragments encoding these polypeptide fragments This gene maps to chromosome 9, and therefore, may be used as a marker in linkage analysis for chromosome 9 (See Accession No. AA004342).

This gene is expressed primarily in fetal liver and spleen.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, hematopoietic and immune disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the hematopoietic and immune systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution of this gene in fetal liver-spleen indicates that the gene could be important for the treatment or detection of immune or hematopoietic disorders including arthritis, leukemia, asthma, and immunodeficiency diseases.

FEATURES OF PROTEIN ENCODED BY GENE NO: 64

This gene maps to chromosome 3, and therefore, may be used as a marker in linkage analysis for chromosome 3 (See Accession No. AA219669).

This gene is expressed specifically in the brain.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neurodegenerative disease states. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the neurological systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the detection/treatment of neurodegenerative disease states and behavioral disorders such as Alzheimer's Disease, Parkinson's Disease, Huntintons Disease, schizophrenia, mania, dementia, paranoia, obsessive compulsive disorder and panic disorder.

FEATURES OF PROTEIN ENCODED BY GENE NO: 65

Gene shares homology with a yeast protein. Preferred polypeptide fragments comprise the following amino acid sequence: LQEVNITLPENSVWYERYKFDIP VFHL (SEQ ID NO:521). Also preferred are polynucleotide fragments encoding these polypeptide fragments. (See Accession No. 1332638)

This gene is expressed primarily in fetal tissue (fetus and fetal liver).

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, liver disorders and cancers (e.g. hepatoblastoma). Similarly,

polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the hepatic system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 298 as residues: Asn-59 to Glu-64.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the detection and treatment of liver disorders and cancers (e.g. hepatoblastoma, jaundice, hepatitis, liver metabolic diseases and conditions that are attributable to the differentiation of hepatocyte progenitor cells). In addition the expression in fetus would suggest a useful role for the protein product in developmental abnormalities, fetal deficiencies, pre-natal disorders and various would-healing models and/or tissue trauma.

FEATURES OF PROTEIN ENCODED BY GENE NO: 66

Gene has homology with a B-cell surface antigen which may indicate gene plays a role in the immune response, including, but not limited to disorders and infections of the immune system. Preferred polynucleotide fragments comprise the following sequence: TAGCATGTAGCCAGTCGAATAACNTATAAGGACAAAGTGGAGTC CACGCGTGCGGCCGTCTAGACTAGTGGATCCCCCGGCTGCAGGATTCGGC ACGAG (SEQ ID NO:523). Also preferred are polypeptide fragments encoded by these polynucleotide fragments (See Accession No.T94535). Additionally, this gene shares homology with an interferon-gamma receptor. Preferred polypeptide fragments also comprise the following amino acid sequence: MQGSGSQFRACLLCLCFSCPC SPGGPRWNSRQGGRRFPKTCRAISQNLVFKYKTFCPVRYMQPHRSSLCLHFTS YVFILSTWGSLRTYSTDLKKKKKNSRGGPVPIRPKS (SEQ ID NO:522); MQGSGSQFRACLLCLCFSCPCSPGGPRWNSRQGGRRFPKTCRAISQNLVFK (SEQ ID NO:524); PVRYMQPHRSSLCLHFTSYVFILSTWGSLRTYSTDLKKKKK NSRGGPVPIRPKS (SEQ ID NO:525); and GEEQRDCSLGWRGVGMRATHCQAA RMFVLFSLPKYAGL (SEQ ID NO:526). Also preferred are polynucleotide fragments encoding these polypeptide fragments

This gene is expressed primarily in T-cells and gall bladder.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immunological disorders and conditions (immunodeficiencies, cancer, leukemia, hematopoeisis). Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune and digestive systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 299 as residues: Thr-41 to Gly-52.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the treatment and diagnosis of immune disorders including: leukemias, lymphomas, auto-immune disorders, immuno-supressive (transplantation) and immunodeficiencies (e.g. AIDS), inflammation and hematopoeitic disorders. The expression of this gene in gall bladder would suggest a possible role for this gene product in digestive disorders, particularly of the pancreas.

FEATURES OF PROTEIN ENCODED BY GENE NO: 67

This gene maps to chromosome 11, and therefore, may be used as a marker in linkage analysis for chromosome 11 (See Accession No. AA011622).

This gene is expressed primarily in a variety of fetal and developmental tissues (e.g. fetal spleen, infant brain).

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, developmental, immune or neurological abnormalities. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the developing immune and central nervous systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or

another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 300 as residues: Ser-38 to Ser-43.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for developmental abnormalities or fetal deficiencies. The detection in infant brain would suggest a role in neurological disorders (both developmental and neurodegenerative conditions of the brain and nervous system, behavioral disorders, depression, schizophrenia, Alzheimer's disease, Parkinson's disease, Huntington's disease, mania, dementia). In addition, the detection in spleen would similarly suggest a role in detection and treatment of immunologically mediated disorders (e.g. immunodeficiency, inflammation, cancer, wound healing, tissue repair, hematopoeisis).

FEATURES OF PROTEIN ENCODED BY GENE NO: 68

This gene is expressed primarily in spleen, T-cells, and fetal heart.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immunological deficiencies, including AIDSand cardiovascular disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune and cardiovascular systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis and treatment of immune disorders including: leukemias, lymphomas, autoimmune disorders, immunodeficiencies (e.g. AIDS), immuno-suppressive conditions (transplantation) and hematopoeitic disorders. The expression in fetal heart indicates that polynucleotides and polypeptides corresponding to this gene are useful for the treatment and diagnosis of cadiovascular disorders (e.g. heart disease, restenosis, atherosclerosis, stoke, angina, thrombosis).

FEATURES OF PROTEIN ENCODED BY GENE NO: 69

Gene shares homology with a human collagen protein. Preferred polypeptide fragments comprise the following amino acid sequence: MPRKTSKCRQLLCSGASRNADTAARQSTCSSHRPPGKIPSLGPRRXPGCXSVPSSRGEQSTGSPAAPRCGRRDAHRGLPGGAAMTPGDTWASFNPRAGHSKSQGEGQESSGASRQDRHPVSHWVERQREAWGAPRSSSAGGVKVAATTEREPEFKIKTGKA (SEQ ID NO:527); CSGASRNADTAARQSTCSSHRPPGKIPSLGPRRXPGCXSVPSSRGEQSTGSPAAPRCGRRDAHRGLPGGAAMTPGDTWASFNPRAGHS (SEQ ID NO:528); QGEGQESSGASRQDRHPVSHWVERQREAWGAPRSSSAGGVKVAATTEREPEFKIKTGKA (SEQ ID NO:529) (See Accession No. 124886). Also preferred are polynucleotide fragments encoding these polypeptide fragments

This gene is expressed primarily in fetal heart.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, cardiovascular disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the cardiovascular system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 302 as residues: Pro-32 to Ser-39.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the treatment and diagnosis of cadiovascular disorders (e.g. heart disease, restenosis, atherosclerosis, stroke, angina, thrombosis).

FEATURES OF PROTEIN ENCODED BY GENE NO: 70

The translation product of this gene shares sequence homology with a chicken single-strand DNA-binding protein. Preferred polypeptide fragments comprise the following amino acid sequence: MSPRYPGGPRPPLRIPNQALGGVPGSQPLLPSGMDPTRQQGHPNMGGPMQRMTPPRGMVPLGPQNYGGAMRPPLNALGGPGMPGMNMGPGGGRPWPNPTNAN

SIPYSSASPGNYVGPPGGGGPPGTPIMPSPADSTNSGDNMYTLMNAVPPGPNR PNFPMGPGSDGPMGGLGGMESHHMNGSLGSGDMDSISKNSPNNMSLSNQP GTPRDDGEMGGNFLNPFQSESYSPSMTMSV (SEQ ID NO:530); MSPRYPGG PRPPLRIPNQALGGVPGSQPLLPSGMDPTRQQGHPNMGGPMQRMTPPRGMVP LGPQNYGGAMRPPLNALGGPGMPGMNMGPGGGRPWPNPTNANSIPYSSASP GNY (SEQ ID. NO:531); LNALGGPGMPGMNMGPGGGRPWPNPTNANSIPYSS ASPGNYVGPPGGGGPPGTPIMPSPADSTNSGDNMYTLMNAVPPGPN (SEQ ID NO:532); GPMGGLGGMESHHMNGSLGSGDMDSISKNSPNNMSLSNQPGTPR DDGEMGGNFLNPFQSESYSPSMTMSV (SEQ ID NO:533); TCEHSSEAKAFHDY (SEQ ID NO:534). Also preferred are polynucleotide fragments encoding these polypeptide fragments. (See Accession No. 1562534)

This gene is expressed primarily in placenta and to a lesser extent in the fetal heart and a variety of other tissues and cell types.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, developmental abnormalities, fetal deficiencies, and particularly of the cardiovascular system. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the reproductive system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the detection and treatment of developmental abnormalities or fetal deficiencies, ovarian and other endometrial cancers, reproductive dysfunction, cardiovascular disorders, and pre-natal disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 71

This gene is expressed primarily in fetal liver and to a lesser extent in the breast and testes.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are

not limited to, liver disorders (including hepatoblastomas) and reproductive disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the hepatic and reproductive systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for detection and treatment of liver disorders and cancers (e.g. hepatoblastoma, jaundice, hepatitis, liver metabolic diseases and conditions that are attributable to the differentiation of hepatocyte progenitor cells). The expression in testes and breast indicates that polynucleotides and polypeptides corresponding to this gene are useful for the detection and treatment of endocrine and reproductive disorders (e.g. sperm maturation, milk production, testicular and breast cancers).

FEATURES OF PROTEIN ENCODED BY GENE NO: 72

This gene maps to chromosome 1, and therefore, may be used as a marker in linkage analysis for chromosome 1 (See Accession No. W93595).

This gene is expressed primarily in smooth muscle and to a lesser extent in brain.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, cardiovascular and neurological disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the cardiovascular and central nervous systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the detection and treatment of restenosis, atherosclerosis, stroke, angina, thrombosis, wound healing and other conditions of heart disease. In addition, the expression in brain would suggest that polynucleotides and polypeptides corresponding to this gene are useful for the detection and treatment of developmental, degenerative and behavioral conditions of the brain and nervous system (e.g. schizophrenia, depression, Alzheimer's disease, Parkinson's disease, Huntington's disease, mania, dementia, paranoia, addictive behavior and sleep disorders).

FEATURES OF PROTEIN ENCODED BY GENE NO: 73

Gene shares homology with human stromalin-2. Preferred polypeptide fragments comprise the following amino acid sequence: QAFVLLSDLLLIFSPQMIVGGRDFLRPLVFFPEATLQSELASFLMDHVFIQPGDL GSGA (SEQ ID NO:535); ACSYLLCNPEFTFFSRADFARSQLVDLLTDRFQQE LEELLQVG (SEQ ID NO:536),QKQLSSLRDRMVAFCELCQSCLSDVDTEIQEQV ST (SEQ ID NO:537); QVILPALTLVYFSILWTLTHISKSDAS (SEQ ID NO:538); STHDLTRWELYEPCCQLLQKAVDTGXVPHQV (SEQ ID NO:539). Also preferred are polynucleotide fragments encoding these polypeptide fragments (See Accession No.R65208) This gene maps to chromosome 7, and therefore, may be used as a marker in linkage analysis for chromosome 7 (See Accession No. D52585).

This gene is expressed primarily in the brain (infant brain, adult brain, pituitary, cerebellum, hippocampus, schizophrenic hypothalmus, amygdala).

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, developmental and neurodegenerative diseases of the brain and nervous system. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the central nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those

comprising a sequence shown in SEQ ID NO: 306 as residues: Thr-25 to Lys-36, Lys-55 to Ser-63.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for detection and treatment of developmental, degenerative and behavioral conditions of the brain and nervous system (e.g. schizophrenia, depression, Alzheimer's disease, Parkinson's disease, Huntington's disease, mania, dementia, paranoia, addictive behavior and sleep disorders).

FEATURES OF PROTEIN ENCODED BY GENE NO: 74

This gene is expressed primarily in the hypothalamus of a human suffering from schizophrenia.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, disorders of the CNS particularly schizophrenia. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the CNS, such as schizophrenia expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 307 as residues: Gly-38 to Ala-44.

The tissue distribution indicates that the protein products of this gene are useful for the study, diagnosis and treatment of schizophrenia and other disorders involving the CNS.

FEATURES OF PROTEIN ENCODED BY GENE NO: 75

Preferred polypeptides of the invention comprise the following amino acid sequence encoded by this gene:
LAVSTSFICCADISTALPLGSSRPAPAPRHREHEHGHQARPPRLLXTSLMPLSTP
AAAQLLWTQLTPMGGRPGGRHSPPTLHTGPRALPPGPPHPSLHVAALSLLR
(SEQ ID NO:540). Polynucleotides encoding such polypeptides are also provided.

This gene is expressed primarily in endometrial tumor and to a lesser extent in amniotic cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, reproductive and immune disorders particularly cancers of those systems. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the reproductive and immune systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 308 as residues: Ser-3 to Arg-9.

The tissue distribution indicates that the protein products of this gene are useful for study and treatment of immune and reproductive disorders particularly cancers of those systems.

FEATURES OF PROTEIN ENCODED BY GENE NO: 76

This gene is expressed primarily in kidney cortex and to a lesser extent in early stage human brain.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, renal disorders such as renal cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the kidney expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 309 as residues: Gly-38 to Gly-45, Gly-47 to Gly-52, Pro-92 to Lys-110.

The tissue distribution indicates that the protein products of this gene are useful for study, treatment and diagnosis of renal diseases such as cancer of the kidney.

FEATURES OF PROTEIN ENCODED BY GENE NO: 77

This gene is expressed primarily in kidney medulla.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, metabolic and renal disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the metabolic and renal systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that the protein products of this gene are useful for study, treatment and diagnosis of metabolic and renal diseases and disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 78

This gene is expressed in chronic synovitis and microvascular endothelium.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, arthritis and atherosclerosis. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the vascular and skeletal systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that the protein products of this gene are useful for study, diagnosis and treatment of arthritic and other inflammatory diseases as well as cardiovascular diseases.

FEATURES OF PROTEIN ENCODED BY GENE NO: 79

This gene is expressed in resting T-cells and activated monocytes.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immune disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that the protein products of this gene are useful for the study and treatment of immune diseases such as inflammatory conditions.

FEATURES OF PROTEIN ENCODED BY GENE NO: 80

This gene is expressed in a variety of immune system tissues, e.g., neutrophils, T-cells, and TNF induced epithelial and endothelial cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, infectious and immune disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune and vascular systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 313 as residues: Met-1 to Trp-6.

The tissue distribution indicates that the protein products of this gene are useful for study and treatment of infectious diseases, immune and vascular disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 81

This gene is expressed in activated neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, inflammation and other immune conditions. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that the protein products of this gene are useful for study and treatment of immune disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 82

This gene is expressed in neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, inflammatory and other immune conditions. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 315 as residues: Ala-83 to Thr-91.

The tissue distribution indicates that the protein products of this gene are useful for study and treatment of immune disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 83

This gene is expressed in human neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, inflammation and immune disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune and inflammatory system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that the protein products of this gene are useful for diagnosis and treatment of disorders of the inflammatory and immune systems.

FEATURES OF PROTEIN ENCODED BY GENE NO: 84

This gene is expressed in human neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, disorders of the inflammatory and immune systems. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the inflammatory and immune systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that the protein products of this gene are useful for diagnosis and treatment of disorders of the immune and inflammatory systems.

FEATURES OF PROTEIN ENCODED BY GENE NO: 85

This gene is expressed in activated neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, inflammation and immune system diseases. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system and inflammatory system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that the protein products of this gene are useful for diagnosis and treatment of diseases of the inflammatory and immune systems.

FEATURES OF PROTEIN ENCODED BY GENE NO: 86

This gene is expressed in activated neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, inflammation and immune system disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the inflammatory and immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 319 as residues: Met-1 to Gly-6, Gly-32 to Pro-43, Leu-55 to Gln-60.

The tissue distribution indicates that the protein products of this gene are useful for diagnosis and treatment of disorders of the immune and inflammatory system.

FEATURES OF PROTEIN ENCODED BY GENE NO: 87

In specific embodiments, polypeptides of the invention comprise the sequence: EQVLALLWPRFELILEMNVQSVRSTDPQRLGGLDTRPHYITRRYAEFSSALVSINQTIPNERTMQLLGQLQVEVENFVLRVAAEFSSRKEQLVFLINNYDMMLGVLMERAADDSKEVESFQQLLNARTQEFIEELLSPPFGGLVAFVKEAEALIERGQAERLRGEEARVTQLIRGFGSSWKSSVESLSQDVMRSFTNFRNGTSIIQG (SEQ ID NO:541); ALLKYRFFYQFLLGNERATAKEIRDEYVETLSKIYLSYYRSYLGRLMKVQYEEVAEKDDLMGVEDTAKKGFXSKPSRSRNTIFTLGTRGSVISPTELEAPILVPHTAQR (SEQ ID NO: 542); EQRYPFEALFRSQHYXLLDNSCREYLFICEFFVVSGPXAHDLFHAVMGRTLSMTLKHLDSYLADCYDAIAVFLCIHIVLRFRNIAAKRDVPALDRYW (SEQ ID NO:543), GGLDTRPHYITRRYAEFSSALVSINQ (SEQ ID NO:544); SRKEQLVFLINNYDMMLGVL (SEQ ID NO: 545) and/or ALLKYRFFYQFLLGNERATAKEIRDEYVETLSKIYLSYYRSYLGRLMKVQYEEVAEKDDLMGVEDTAKKGFXSKPSLRSRNTIFTLGTRGSVISPTELEAPILVPHTAQRXEQRYPFEALFRSQHYXLLDNSCREYLFICEFFVVSGPXAHDLFHAVMGRTLSMTLKHLDSYLADCYDAIAVFLCIHIVLRFRNIAAKRDVPALDRYWEQVLALLWPRFELILEMNVQSVRSTDPQRLGGLDTRPHYITRRYAEFSSALVSINQTIPNERTMQLLGQLQVEVENFVLRVAAEFSSRKEQLVFLINNYDMMLGVLMERAADDSKEVESFQQLLNARTQEFIEELLSPPFGGLVAFVKEAEALIERGQAERLRGEEARVTQLIRGFGSSWKSSVESLSQDVMRSFTNFRNGTS (SEQ ID NO:546). Polynucleotides encoding these polypeptides are also encompassed by the invention. The translation product of this gene shares sequence homology with suppressor of actin mutation which is thought to be important in mutation suppression.

This gene is expressed primarily in fetal liver and to a lesser extent in a variety of other tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, liver and mutations. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the liver or cancer, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level

in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 320 as residues: Val-53 to Arg-60, Thr-88 to Thr-94, Ala-142 to Ser-150, Gly-188 to Glu-196, Gly-208 to Ser-214, Thr-227 to Gly-232, Lys-279 to Phe-285.

The tissue distribution and homology to suppressor of actin mutation suggest that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and of liver disorder or cancer.

FEATURES OF PROTEIN ENCODED BY GENE NO: 88

This gene maps to chromosome 9, and therefore can be used in linkage analysis as a marker for chromosome 9. In specific embodiments, polypeptides of the invention comprise the sequence: YEGKEFDYVFSIDVNEGGPSYKLPYNTSDDPWLTAYNFLQKNDLNPMFLDQVAKFIIDNTKGQMLGLGNPSFSDPFTGGGRYVPGSSGSSNTLPTADPFTGAGRYVPGSASMGTTMAGVDPFTGNSAYRSAASKTMNIYFPKKEAVTFDQANPTQILGKLKELNGTAPEEKKLTEDDLILLEKILSLICNSSSEKPTVQQLQILWKAINCPEDIVFPALDILRLSIKHPSVNENFCNEKEGAQFSSHLINLLNPKGKPANQLLALRTFCNCFVGQAGQKLMMSQRESLMSHAIELKSGSNKNI (SEQ ID NO: 547); HIALATLALNYSVCFHKD (SEQ ID NO: 548); HNIEGKAQCLSLISTILEVVQDLEATFRLLVALGTLISDDSNAVQLAKS (SEQ ID NO:549); LGVDSQIKKYSSVSEPAKVSECCRFILNLL (SEQ ID NO:550); and/or YEGKEFDYVFSIDVNEGGPSYKLPYNTSDDPWLTAYNFLQKNDLNPMFLDQVAKFIIDNTKGQMLGLGNPSFSDPFTGGGRYVPGSSGSSNTLPTADPFTGAGRYVPGSASMGTTMAGVDPFTGNSAYRSAASKTMNIYFPKKEAVTFDQANPTQILGKLKELNGTAPEEKKLTEDDLILLEKILSLICNSSSEKPTVQQLQILWKAINCPEDIVFPALDILRLSIKHPSVNENFCNEKEGAQFSSHLINLLNPKGKPANQLLALRTFCNCFVGQAGQKLMMSQRESLMSHAIELKSGSNKNIHIALATLALNYSVCFHKDHNIEGKAQCLSLISTILEVVQDLEATFRLLVALGTLISDDSNAVQLAKSLGVDSQIKKYSSVSEPAKVSECCRFILNLL (SEQ ID NO:551). Polynucleotides encoding these polypeptides are also encompassed by the invention. These polypeptides share significant homology with phospholipase A2 activating protein which is thought to be important in signal transduction (see, e.g., Wang et al., Gene 161(2):237-241 (1995)).

This gene is expressed primarily in endothelial cells, to a less extent in placenta, endometrial stromal cells, osteosarcoma, testis tumor, muscle, and infant brain that are likely to be rich in blood vessels.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a

biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, disorders in vascular system, aberrent angiogenesis, tumor angiogenesis. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the vascular system or tumors, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution of this gene in endothelial cells and several potential highly vascularized tissues and its homology to phospholipase A2 activating protein suggest that this gene may be involved in transducing signals for endothelial cells in angiogenesis or vasculogenesis.

FEATURES OF PROTEIN ENCODED BY GENE NO: 89

In specific embodiments, polypeptides of the invention comprise the sequence: YPNQDGDILRDQVLHEHIQRLSKVVTANHRALQIPEVYLREAPWPSAQSEIRTIS AYKTPRDKVQCILRMCSTIMNLLSLANEDSVPGADDFVPVLVFVLIKANPPCLL STVQYISSFYASCLSGEESYWWMQFTAAVE (SEQ ID NO:552); YPNQDGDILR DQVLHEHIQRLSKVVTANHRALQIPEVYLREAPWPSAQSEIRTISAYKTPRDKVQ CILRMCSTIMNLLSLANEDSVPGADDFVPVLVFVLIKANPPCLLSTVQYISSFYA SCLSGEESYWWMQFTAAVEFIKTI (SEQ ID NO:553); YPNQDGDILRDQVL (SEQ ID NO:554); EAPWPSAQSEI (SEQ ID NO:555); PVLVFVLIKANP (SEQ ID NO:560); SGEESYWWMQFTAAVEFIKTI (SEQ ID NO:556); ADDFVPVLVF VLIKANPP (SEQ ID NO:557); YKTPRDKVQCIL (SEQ ID NO:558); and/or GADDFVPVLVFVLIK (SEQ ID NO:559). The translation product of this gene shares sequence homology with human ras inhibitor and yeast VPS9p which is thought to be important in golgi vacuole transport.

This gene is expressed primarily in T cells and melanocytes and to a lesser extent in a variety of other tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, dysfunction and disorders involving T cells and melanocytes. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing

immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to ras inhibitor indicates that polynucleotides and polypeptides corresponding to this gene are useful for regulating signal transduction; diagnosis and treatment of disorders involving T cells and melanocytes.

FEATURES OF PROTEIN ENCODED BY GENE NO: 90

This gene maps to chromosome 9 and therefore polypeptides of the invention can be used in linkage analysis as a marker for chromosome 9. The translation product of this gene shares sequence homology with neuronal olfactomedin-related ER localized protein which is thought to be important in influence the maintenance, growth, or differentiation of chemosensory cilia on the apical dendrites of olfactory neurons. In specific embodiments, polypeptides of the invention comprise the sequence: SARASTQPPAGQHPGPC (SEQ ID NO:561); MPGRWRWQRDMHPARKLLSLL FLILMGTELTQD (SEQ ID NO:562); SAAPDSLLRSSKGSTRGSL (SEQ ID NO:563); AAIVIWRGKSESRIAKTPGI (SEQ ID NO:564); FRGGGTLVLPPTHT PEWLIL (SEQ ID NO:567); PLGITLPLGAPETGGGD (SEQ ID NO:565); and/or CAAETWKGSQRAGQLCALLA (SEQ ID NO:566).

This gene is expressed in pineal gland.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neurological and endocrinological disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the neurological or endocrine systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e.,

the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 323 as residues: Leu-20 to Ala-26, Arg-32 to Arg-39, Thr-104 to Gly-112.

The tissue distribution and homology to olfactomedin-related protein indicates that polynucleotides and polypeptides corresponding to this gene are useful for maintenance, growth, or differentiation of neuron cells in pineal gland, therefore, may be useful for diagnosis and treatment of neurological disorders in pineal gland.

FEATURES OF PROTEIN ENCODED BY GENE NO: 91

This gene is expressed primarily in prostate and apoptotic T cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, prostate disease and T cell dysfunction. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the prostate cancer, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for detect abnormal activity in prostate and T cells or probably treatment of this abnormality.

FEATURES OF PROTEIN ENCODED BY GENE NO: 92

This gene is expressed primarily in prostate and to a lesser extent in smooth muscle cells, fibroblasts, and placenta.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, disorders in prostate or vascular system. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the prosate or vascular system, expression of this gene at significantly higher or lower levels may be routinely detected in certain

tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for regulating function of prostate or highly vascularized tissues, e.g. placenta.

FEATURES OF PROTEIN ENCODED BY GENE NO: 93

This gene is expressed primarily in embryos and fetal tissues stage human and to a lesser extent in a wide variety of other proliferative tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, disorders in embryonic development and cell proliferation. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the embryonic tissues and proliferative cells, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis or treatment of abnormalities in developing and proliferative cells and organs.

FEATURES OF PROTEIN ENCODED BY GENE NO: 94

The translation product of this gene shares sequence homology with transformation related protein which is thought to be important in transformation.

This gene is expressed primarily in female reproductive tissues, i.e., breast cancer cells, placenta, and ovary and to a lesser extent in fetal lung.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are

not limited to, cancer or dysfunction of reproductive tissues. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the reproduction system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 327 as residues: Ser-50 to Pro-61.

The tissue distribution and homology to transformation related protein indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of conditions caused by transformation, i.e. tumorigenesis in reproductive organs, e.g. breast, placenta, and ovary.

FEATURES OF PROTEIN ENCODED BY GENE NO: 95

This gene is expressed primarily in testes, rhabdomyosarcoma, infant brain and to a lesser extent in some tumors and highly vascularized tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, tumorigenesis, abnormal angiogenesis, and/or neurological disorders. , Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the tumor tissues or vascular tissues, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 328 as residues: Arg-46 to Trp-54, Pro-60 to Ile-69, Asn-116 to Ala-122, Arg-147 to Lys-153, Ser-158 to Glu-170, Ile-399 to Ser-405, Pro-486 to Met-499, Pro-502 to Asp-508.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for a range of disease states including treatment of

tumor or vascular disorders and the treatment of neurological disorders such as Alzheimer's Disease, Parkinson's Disease, Huntingtons Disease, schizophrenia, mania, dementia, paranoia, obsessive compulsive disorder and panic disorder.

FEATURES OF PROTEIN ENCODED BY GENE NO: 96

This gene maps to chromosome 7 and therefore polynucleotides of the present invention can be used in linkage analysis as a marker for chromosome 7. The translation product of this gene is homologous to the Clostridium perfringens enterotoxin (CPE) receptor gene product and shares sequence homology with a human ORF specific to prostate and a glycoprotein specific to oligodendrocytes both of which are tissue specific proteins.(See e.g., Katahira et al., J Cell Biol. 136(6):1239-1247 (1997). PMID: 9087440; UI: 97242441.

This gene is expressed primarily in pancreas tumor and ulcerative colitis and to a lesser extent in several tumors and normal tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, pancreatic disorder, ulcerative colitis, tumors and food poisoning. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the digestive system or tumorigenic system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 329 as residues: Gly-147 to Met-152, Cys-177 to Lys-188.

The tissue distribution and homology to prostate and oligodendrocyte-specific protein indicates that polynucleotides and polypeptides corresponding to this gene are useful for marker of diagnosis or treatment of disorder in pancreas, ulcerative colitis, and tumors. Furthermore, identity to the human receptor for Clostridium perfringenes entertoxin indicates that the soluble portion of this receptor could be used in the treatment of food poisoning associated with Clostridia perfringens by blocking the activity of perfringens enterotoxin.

FEATURES OF PROTEIN ENCODED BY GENE NO: 97

The translation product of this gene shares sequence homology with ATPase which is thought to be important in metabolism.

This gene is expressed primarily in testes and several hematopoietic cells and to a lesser extent in other tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, leukemia and hematopoietic disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the hematopoietic system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 330 as residues: Leu-37 to Ala-42.

The tissue distribution and homology to ATPase indicates that polynucleotides and polypeptides corresponding to this gene are useful for marker of diagnosis and treatment of leukemia and other hematopoietic disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 98

In specific embodiments, polypeptides of the invention comprise the sequence: MRSARPSLGCLPSWAFSQALNI (SEQ ID NO:568); LLGLKGLAPAEISAVCE KGNFN (SEQ ID NO:569); VAHGLAWSYYIGYLRLILPELQARIR (SEQ ID NO:570); TYNQHYNNLLRGAVSQRC (SEQ ID NO:571); ILLPLDCGVPDNLSM ADPNIRFLDKLPQQTGDRAGIKDRVYSN (SEQ ID NO:572); SIYELLENGQRAGT CVLEYATPLQTLFAMSQYSQAGFSGEDRLEQ (SEQ ID NO:573); AKLFCRTLE DILADAPESQNNCRLIAYQEPADDSSFSLSQEVLRHLRQEEKEEVTVGSLKTSAV PSTSTMSQEPELLISGMEKPLPLRTDFS (SEQ ID NO:574); and/or LLGLKGLA PAEISAVCEKGNFNVAHGLAWSYYIGYLRLILPEL (SEQ ID NO:575). Polynucleotides encoding these polypeptides are also encompassed by the invention.

This gene is expressed primarily in prostate BPH and to a lesser extent in bone marrow.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, benign prostatic hypertrophy or prostate cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the male urinary system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 331 as residues: Ile-60 to Asn-69, Leu-106 to Asp-112, Glu-130 to Gly-136, Phe-160 to Glu-167, Pro-184 to Cys-190, Glu-197 to Ser-202, Arg-215 to Glu-221, Thr-237 to Pro-242.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis or treatment of benign prostatic hypertrophy or prostate cancer.

FEATURES OF PROTEIN ENCODED BY GENE NO: 99

This gene is expressed primarily in salivary gland.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, disorders or injuries of the salivary gland. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of glandular tissues, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment of disorders of, or injuries to the salivary gland or other glandular tissue.

FEATURES OF PROTEIN ENCODED BY GENE NO: 100

This gene maps to chromosome 15, accordingly, polynucleotides of the invention can be used in linkage analysis as a marker for chromosome 15. The translation product of this gene shares sequence homology with a *C.elegans* gene of unknown function. In specific embodiments, polypeptides of the invention comprise the sequence: DPRVRLNSLTCKHIFISLTQ (SEQ ID NO:583); TMKLLKLRRNIV KLSLYRHFTN (SEQ ID NO:576); TLILAVAASIVFIIWTTMKFRI (SEQ ID NO:577); VTCQSDWRELWVDDAIWRLLFSMILFVI (SEQ ID NO:578); MVLWR PSANNQRFAFSPLSEEEEEDEQ (SEQ ID NO:580); KEPMLKESFEGMKMRS TKQEPNGNSKVNKAQEDDL (SEQ ID NO:584); and/or KWVEENVPSSVTDVALP ALLDSDEERMITHFERSKME (SEQ ID NO:582). Polynucleotides encoding these polypeptides are also encompassed by the invention.

This gene is expressed primarily in thyroid and to a lesser extent in osteoclastoma, kidney medulla, and lung.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, thyroid dysfunction or cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the endocrine system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 333 as residues: Lys-107 to Leu-124, Glu-150 to Thr-159, Pro-173 to Asp-179, Ser-192 to Ser-201.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of thyroid dysfunction or cancer.

FEATURES OF PROTEIN ENCODED BY GENE NO: 101

This gene maps to chromosome 16, therefore polynucleotides of the invention can be used in linkage analysis as a marker for chromosome 16. In specific embodiments, polypeptides of the invention comprise the sequence:

IRHELTVLRDTRPACA (SEQ ID NO:585); and/or MDFXMALIYD (SEQ ID NO:586). Polynucleotides encoding these polypeptides are also encompassed by the invention.

This gene is expressed primarily in kidney cortex and to a lesser extent in adult brain, corpus colosum, hippocampus, and frontal cortex.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neurological disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the central nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment or diagnosis of neurological disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 102

In specific embodiments, polypeptides of the invention comprise the sequence: MQEMMRNQDRALSNLESIPGGYNA (SEQ ID NO:587); LRRMYTDIQEPMLSA AQEQF GGNPF (SEQ ID NO:588); ASLVSNTSSGEGSQPSRTENRDPLPNPWAP QT (SEQ ID NO:589); SQSSSASSGTASTVGGTTGSTASGTSGQSTTAPNLVPGV GASMFNTPG MQSLLQQITENPQLMQNMLSAPY (SEQ ID NO:590); MRSMMQSLSQNPDLAAQMMLNNPLFAGNPQLQEQMRQQLPTFLQQ (SEQ ID NO:591); MQNPDTLSAMSNPRAMQALLQIQQGLQTLATEAPGLIPGFTPGLG ALGSTGGSSGTNGSNATPSENTSPTAGT (SEQ ID NO:592); TEPGHQQFI QQMLQALAGVNPQLQNPEVRFQQQLEQLSAMGFLNREANLQALIATGGDINAA IERLLGSQPS (SEQ ID NO:593); RNPAMMQEMMRNQDRALSNLESIPGGY NALRRMYTDIQEPMLSAA (SEQ ID NO:594); GNPFASLVSNTSS (SEQ ID NO:595); ENRDPLPNPWA (SEQ ID NO:595); GKILKDQDTLSQHGIHD (SEQ ID NO:597); GLTVHLVIKTQNRP (SEQ ID NO:598); SELQSQMQRQLLSNPEMM (SEQ ID NO:599); PEISHMLNNPDIMR (SEQ ID NO:600); and/or RQLIMANPQMQQLIQRNP (SEQ ID NO:601). Polynucleotides encoding these

polypeptides are also encompassed by the invention.

This gene is expressed primarily in breast.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, breast cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of tumor systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment and diagnosis of some types of breast cancer.

FEATURES OF PROTEIN ENCODED BY GENE NO: 103

The translation product of this gene shares sequence homology with secreted serine proteases and lysozyme C precursor, which is thought to be important in bacteriolytic function. In specific embodiments, polypeptides of the invention comprise the sequence: NLCHVDCQDLLNPNLLAGIHCAKRIVS (SEQ ID NO:602); LDGFEGYSLSDWLCLAFVESKFN (SEQ ID NO:603); NENADGSFDYGLFQINSHYWCN (SEQ ID NO:604); and/or NLCHVDCQDLLNPNLLAGIHCAKRIVS (SEQ ID NO:605). Polynucleotides encoding these polypeptides are also encompassed by the invention.

This gene is expressed primarily in testes.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, infection. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or

another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 336 as residues: Ile-62 to Phe-70, Asn-78 to Asn-84.

The tissue distribution and homology to lysozyme C precursor indicates that polynucleotides and polypeptides corresponding to this gene are useful for boosting the moncyte-macrophage system and enhance the activity of immunoagents.

FEATURES OF PROTEIN ENCODED BY GENE NO: 104

This gene is expressed primarily in apoptotic T-cell.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immune disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment and diagnosis of some immune disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 105

The translation product of this gene shares sequence homology with ARI protein of Drosophila (accession 2058299; EMBL: locus DMARIADNE, accession X98309), which is thought to be important in axonal path-finding in the central nervous system. In specific embodiments, polypeptides of the invention comprise the sequence IREVNEVIQNPAT (SEQ ID NO:606); ITRILLSHFNWDKEKLMERYF DGNLEKLFA (SEQ ID NO:607); NTRSSAQDMPCQICYLNYPNSYF (SEQ ID NO:608); TGLECGHKFCMQCWSEYLTTKIMEEGMGQTISCPAHG (SEQ ID NO:614); CDILVDDNTVMRLITDSKVKLKYQHLITNSFVECNRLLKWCPAPD CHHVVKVQYPDAKPV (SEQ ID NO:609); CDILVDDNTVMRLITDSK

VKLKYQHLITNSFVECNRLLKWCPAPDCHHVVKV (SEQ ID NO:610); GCNHMVCRNQNCKAEFCWVCLGPWEPHGSAWYNCNRYNEDDAKAARDAQE RSRAALQRYL (SEQ ID NO:611); FYCNRYMNHMQSLRFEHKLYAQVKQ KMEEMQQHNMSWIEVQFLKKAVDVLCQCRATLMYT (SEQ ID NO: 612); YVFAFYLKKNNQSIIFENNQADLENATEVLSGYLERDISQDSLQDIKQKVQDKY RYCESR (SEQ ID NO:613) Polynucleotides encoding these polypeptides are also encompassed by the invention.

This gene is expressed primarily in adult brain, and to a lesser extent in endometrial tumor, melanocytes, and infant brain.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases or injuries involving axonal path development. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the central nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to ARI protein indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment of disease states or injuries involving axonal path development, including neurodegenerative diseases and nerve injury.

FEATURES OF PROTEIN ENCODED BY GENE NO: 106

The translation product of this gene shares sequence homology with cytochrome b561 [Sus scrofa] which is thought to be an integral membrane protein of neuroendocrine storage vesicles of neurotransmitters and peptide hormones.

This gene is expressed primarily in frontal cortex and to a lesser extent in rhabdomyosarcoma.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neurological disorders. Similarly, polypeptides and antibodies directed to

these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the central nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 339 as residues: Ser-18 to Pro-24.

The tissue distribution and homology to cytochrome b561 [Sus scrofa] indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment and diagnosis of neurological disorders. This gene may also be important in regulation of some types of cancers.

FEATURES OF PROTEIN ENCODED BY GENE NO: 107

In specific embodiments, polypeptides of the invention comprise the sequence: MWGYLFVDAAWNFLGCLICGW (SEQ ID NO:615); MHFISSGNVSAIRSSILLL RXSLSYLGNCLRVSAIFVYFLLFLLLS (SEQ ID NO:616); and/or MDQALRGSPSE GFSTDPSPPQVGRQIPSFPPWRRLVLPKASGCFLEREWWLCVFKLRTRPGAEA HAYNSSILGGRGKGIT (SEQ ID NO:617). Polynucleotides encoding these polypeptides are also encompassed by the invention.

This gene is expressed primarily in pancreas tumor and to a lesser extent in cerebellum.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, pancreatic tumors. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the endocrine system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred

epitopes include those comprising a sequence shown in SEQ ID NO: 340 as residues: Pro-22 to Phe-33.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of pancreatic tumors.

FEATURES OF PROTEIN ENCODED BY GENE NO: 108

This gene maps to chromosome 17 and therefore polynucleotides of the invention can be used in linkage analysis as a marker for chromosome 17. In specific embodiments, polypeptides of the invention comprise the sequence: MLPALASCCHFSPPEQAARLKKLQEQEKQQKVEFRKRMEKEVSDFIQDSGQIK KKFQPMNKIERSILHDVVEVAGLTSFSFGEDDDCRYVMIFKKEFAPSDEELDSY RRGEEWDPQKAEEKRNXKELAQRQ (SEQ ID NO:618); EEEAAQQGPVVV SPASDYKDKYSHLIGKGAAKDAAHMLQANKTYGCXPVANKRDTRSIEEAMNE IRAKKRLRQSGE (SEQ ID NO:619); PPRRPAQLPLTPGAGQGAGRDKAAAIRA HPGAPPLNHLLP (SEQ IDNO:620); AVPQAGGKQVFDLSPLELGYVRGMCVCV (SEQ ID NO:621) and/or MLPALASCCHFSPPEQAARLKKLQEQEKQQKVEFRK RMEKEVSDFIQDSGQIKKKFQPMNKIERSILHDVVEVAGLTSFSFGEDDDCRYV MIFKKEFAPSDEELDSYRRGEEWDPQKAEEKRNXKELAQRQEEEAAQQGPVVV SPASDYKDKYSHLIGKGAAKDAAHMLQANKTYGCXPVANKRDTRSIEEAMNE IRAKKRLRQSGE (SEQ ID NO:622). Polynucleotides encoding these polypeptides are also encompassed by the invention. The translation product of this gene shares sequence homology with FSA-1 which may play a role as a structural protein component of the acrosome.

This gene is expressed primarily in fetal kidney and sperm.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, male reproductive disorders, especially involving acrosomal disfunction. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the male reproductive system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an

individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 341 as residues: Glu-8 to Asn-35.

The tissue distribution and homology to FSA-1 indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment of infertility due to acrosomal disfunction of sperm.

FEATURES OF PROTEIN ENCODED BY GENE NO: 109

This gene is expressed primarily in pituitary and to a lesser extent in epididymus.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, male reproductive disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the male reproductive system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 342 as residues: Met-1 to Trp-6.

Because the gene is found in both pituitary and epididymus, this indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment and diagnosis of male reproductive disorders. This may involve a secreted peptide produced in the pituitary targeting the epididymus.

FEATURES OF PROTEIN ENCODED BY GENE NO: 110

In specific embodiments, polypeptides of the invention comprise the sequence: LLCPVLNSGXSWNFPHPSQPEYSFHGFHSTRLWI (SEQ ID NO:623); and/or PSTPWFLFLLGLTCPFSTSHPRWDSIPP (SEQ ID NO:624). Polynucleotides encoding these polypeptides are also encompassed by the invention.

This gene is expressed primarily in resting T-cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are

not limited to, T-cell disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment and diagnosis of certain immune disorders, especially those involving T-cells.

FEATURES OF PROTEIN ENCODED BY GENE NO: 111

This gene is expressed primarily in cerebellum and whole brain and to a lesser extent in infant brain and fetal kidney.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neurological disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the central nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 344 as residues: Asp-48 to Gly-55.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of neurological disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 112

The translation product of this gene shares sequence homology with yeast mitochondrial ribosomal protein homologous to ribosomal protein s15 of E.coli which

is thought to be important in the early assembly of ribosomes (See Accession No. M38016). This gene maps to chromosome 1, and therefore, may be used as a marker in linkage analysis for chromosome 1.

This gene is expressed primarily in developmental tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, development of cancers and tumors in addition to healing wounds. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune and developmental expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to ribosomalprotein s15 of E. coli indicates that polynucleotides and polypeptides corresponding to this gene are useful for diseases related to the assembly of ribosomes in the mitochondria which is important in the translation of RNA into protein. Therefore, this indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and intervention of multiple tumors as well as in healing wounds which are thought to be under similar regulation as developmental tissues. Protein, as well as, antibodies directed against the protein have utility as tumor markers, in addition to immunotherapy targets, for the above listed tumors and tissues.

FEATURES OF PROTEIN ENCODED BY GENE NO: 113

The translation product of this gene shares sequence homology with human poliovirus receptor precursors which are thought to be important in viral binding and uptake. Preferred polypeptide fragments comprise the following amino acid sequence: ELSISISNVALADEGEYTCSIFTMPVRTAKSLVTVLGIPQKPIITGYKSSLREKDT ATLNCQSSGSKPAARLTWRKGDQELHGEPTRIQEDPNGKTFTVSSSVTFQVTR EDDGASIVCSVNHESLKGADRSTSQRIEVLYTPTAMIRPDPPHPREGQKLLLHC EGRGNPVPQQYLWEKEGSVPPLKMTQESALIFPFLNKSDSGTYGCTATSNMGS YKAYYTLNVND (SEQ ID NO:625). Also preferred are polynucleotide fragments encoding these polypeptide fragments (See Accession No. gnl|PID|d1002627).

This gene is expressed almost exclusively in human brain tissue.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, susceptibility to viral disease and diseases of the CNS especially cancers of that system. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the central nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 346 as residues: Leu-26 to Asp-37, Lys-53 to Ser-59.

The tissue distribution and homology to poliovirus receptor precursors indicates that polynucleotides and polypeptides corresponding to this gene are useful for the treatment and prevention of diseases that involve the binding and uptake of virus particles for infection. It might also be helpful in genetic therapy where the goal is to insert foreign DNA into infected cells. With the help of this protein, the binding and uptake of this foreign DNA might be aided. In addition, it is expected that over expression of this gene will indicate abnormalities involving the CNS, particularly cancers of that system.

FEATURES OF PROTEIN ENCODED BY GENE NO: 114

The translation product of this gene shares sequence homology with YO87_CAEEL hypothetical 28.5 KD protein ZK1236.7 in chromosome III of Caenorhabditis elegans in addition to alpha-1 collagen type III (See Accession No. gil537432). One embodiment for this gene is the polypeptide fragment(s) comprising the following amino acid sequence: VPELPDRVHQLHQAVQGCALGRPGFPGGPTH SGHHKSHPGPAGGDYNRCDRPGQVHLHNPRGTGRRGQLHPTAGPGVHRRA CPSQQLPHRLGPGVPCPSPSLTPVLPSWTQSWCG LPGYTSSS (SEQ ID NO:630). An additional embodiment is the polynucleotide fragment(s) encoding these polypeptide fragments

This gene is expressed primarily in brain cells and to a lesser extent in activated B and T cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neurodegeneration and imunological disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the neural and immune systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 347 as residues: Glu-34 to Glu-39, Gly-51 to Ser-72, Ala-88 to Glu-93, Gln-100 to Val-105.

The tissue distribution and homology to YO87_CAEEL hypothetical 28.5 KD protein ZK1236.7 in chromosome III of Caenorhabditis elegans as well as to a conserved alpha-1 collagen type III protein indicates that polynucleotides and polypeptides corresponding to this gene are useful for the detection and treatment of neurodegenerative disease states and behavioral disorders such as Alzheimer's Disease, Parkinson's Disease, Huntingtons' Disease, schizophrenia, mania, dementia, paranoia, obsessive compulsive disorder and panic disorders. Because the gene is expressed in cells of lymphoid origin, the natural gene product may be involved in immune functions. Therefore it may be also used as an agent for immunological disorders including arthritis, asthma, immune deficiency diseases such as AIDS, and leukemia.

FEATURES OF PROTEIN ENCODED BY GENE NO: 115

The translation product of this gene shares sequence homology with alpha 3 type IX collagen which is thought to be important in hyaline cartilage formation via its ability to uptake inorganic sulfate by cells (See Accession No. gil975657). One embodiment of this gene is the polypeptide fragment comprising the following amino acid sequence: SLRRPRSAAXQTLTTFLSSVSSASSSALPGSREPCDPRAPPPPR SGSAASCCSCCCSCPRRRAPLRSPRGSKRRIRQREVVDLYNGMCLQGPAGVPG RDGSPGANGIPGTPGIPGRDGFKGEKGECLRESFEESWTPNYKQCSWSSLNY GIDLGKIAECTFTKMRSNSALRVLFSGSLRLKCRNACCQRWYFTFNGAECSGP LPIEAIIYLDQGSPEMNSTINIHRTSSVEGLCEGIGAGLVDVAIWVGTCSDYPKG DASTGWNSVSRIIIEELPK (SEQ ID NO:634). An additional embodiment are the

polynucleotide fragments encoding this polypeptide fragment.

This gene is expressed primarily in smooth muscle and to a lesser extent in synovial tissue.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, dwarfism, spinal deformation, and specific joint abnormalities as well as chondrodysplasias i.e., spondyloepiphyseal dysplasia congenita, familial osteoarthritis, Atelosteogenesis type II, metaphyseal chondrodysplasia type Schmid and autoimmune disorders . Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the skeletal system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to alpha 3 type IX collagen indicates that polynucleotides and polypeptides corresponding to this gene are useful for the treatment and diagnosis of diseases associated with the mutation in this gene which leads to the many different types of chondrodysplasias. By the use of this product, the abnormal growth and development of bones of the limbs and spine could be routinely detected or treated in utero since the protein or muteins thereof could affect epithelial cells early in development and later the chondrocytes of the developing craniofacial structure.

FEATURES OF PROTEIN ENCODED BY GENE NO: 116

The translation product of this gene shares sequence homology with retrovirus-related reverse transcriptase which is thought to be important in viral replication. One embodiment for this gene is the polypeptide fragments comprising the following amino acid sequence: TKKENCRPASLMNIDTKILNKILMNQ (SEQ ID NO:640). An additional embodiment is the polynucleotide fragments encoding these polypeptide fragments (See Accession No. pir|A25313|GNHUL1).

This gene is expressed primarily in human meningima.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are

not limited to, retroviral diseases such as AIDS, and possibly certain cancers due to transactivation of latent cell division genes. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to retrovirus-related reverse transcriptase indicates that polynucleotides and polypeptides corresponding to this gene are useful for the detection and treatment of diseases and maladies associated with retroviral infection since a functional reverse transcriptase (RT) or RT-like molecule is an integral component of the retroviral life cycle.

FEATURES OF PROTEIN ENCODED BY GENE NO: 117

The translation product of this gene shares sequence homology with an unknown gene from *C. elegans*, as well as weak homolog with mammalian metaxin, a gene contiguous to both thrombospondin 3 and glucocerebrosidase, is known to be required for embryonic development. Preferred polypeptide fragments comprise the following amino acid sequence: MCNLPIKVVCRANAEYMSPSGKVPXXHVGNQ VVSELGPIVQFVKAKGHSLSDGLEEVQKAEMKAYMELVNNMLLTAELYLQWC DEATVGXITHXRYGSPYPWPLXHILAYQKQWEVKRKXKAIGWGKKTLDQVLE DVDQCCQALSQRLGTQPYFFNKQPTELDALVFGHLYTILTTQLTNDELSEKVKN YSNLLAFCRRI EQHYFEDRGKGRLS (SEQ ID NO:641); MCNLPIKVVCRANAE YMSPSGKVPXXHVGNQVVSELGPIVQFVK (SEQ ID NO:642),. Also preferred are polynucleotide fragments encoding these polypeptide fragments (See Accession No. gi|1326108).

This gene is expressed primarily in fetal tissues and to a lesser extent in hematopoietic cells and tissues, including spleen, monocytes, and T cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, cancer; lymphoproliferative disorders; inflammation; chondrosarcoma, and Gaucher disease. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification

of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the hematopoietic and embryonic systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis and treatment of cancer and other proliferative disorders. Expression in embryonic tissue and other cellular sources marked by proliferating cells indicates that this protein may play a role in the regulation or cellular division. Additionally, the expression in hematopoietic cells and tissues indicates that this protein may play a role in the proliferation, differentiation, and survival of hematopoietic cell lineages. Thus, this gene may be useful in the treatment of lymphoproliferative disorders, and in the maintenance and differentiation of various hematopoietic lineages from early hematopoietic stem and committed progenitor cells.

FEATURES OF PROTEIN ENCODED BY GENE NO: 118

The translation product of this gene shares sequence homology with reverse transcriptase which is important in the synthesis of a cDNA chain from an RNA molecule, and is a method whereby the infecting RNA chains of retroviruses are transcribed into their DNA complements. One embodiment for this gene is the polypeptide fragment comprising the following amino acid sequence: MXXXNSHITIFTLNVNGLNAPNERHRLANWIQSQDQVCCIQETHLTGRDTHRL KIKGWRKIYQANGKQKK (SEQ ID NO:647). An additional embodiment is the polynucleotide fragments comprising polynucleotides encoding these polypeptide fragments (See Accession No. gi|2072964).

This gene is expressed primarily in skin and to a lesser extent in neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions which include, but are not limited to, cancer, hematopoietic disorders; inflammation; disorders of immune surveillance. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the epidermis and/or hematopoietic system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and

wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to reverse transcriptase indicates that polynucleotides and polypeptides corresponding to this gene are useful for cancer therapy. Expression in the skin also indicates that this gene is useful in wound healing and fibrosis. Expression by neutrophils also indicates that this gene product plays a role in inflammation and the control of immune surveillance (i.e. recognition of viral pathogens). Reverse transcriptase family members are also useful in the detection and treatment of AIDS.

FEATURES OF PROTEIN ENCODED BY GENE NO: 119

The translation product of this gene shares sequence homology with reverse transcriptase which is important in the synthesis of a cDNA copy of an RNA molecule, and is a method whereby a retrovirus reverse-transcribes its genome into an inheritable DNA copy.

This gene is expressed primarily in the frontal cortex of brain.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, cancer and neurodegenerative disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the CNS and peripheral nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to reverse transcriptase suggest that this is useful in the treatment of cancer and AIDS. The expression in brain indicates that it plays a role in neurodegenerative disorders and in neural degeneration.

FEATURES OF PROTEIN ENCODED BY GENE NO: 120

One embodiment of this gene has homology to a hypothetical protein in Schizosaccharomyces pombe (See Accession No. 2281980). Another embodiment for this gene is the polypeptide fragments comprising the following amino acid sequence: IYHLHSWIFFHFKRAFCMCFITMKVIHAHCSKLRKCXNAQISVFCTTLTASYPT (SEQ ID NO:651). An additional embodiment is the polynucleotide fragments encoding these polypeptide fragments. This gene maps to chromosome 18, and therefore, may be used as a marker in linkage analysis for chromosome 18.

This gene is expressed primarily in adult hypothalamus and to a lesser extent in infant brain.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neurodegenerative disorders; endocrine function; and vertigo. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the brain, CNS and peripheral nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the treatment and diagnosis of neurodegenerative disorders; diagnosis of tumors of a brain or neuronal origin; treatments involving hormonal control of the entire body and of homeostasis, behavioral disorders, such as Alzheimer's Disease, Parkinson's Disease, Huntington's Disease, schizophrenia, mania, dementia, paranoia, obsessive compulsive disorder and panic disorder. In addition, the gene or gene product may also play a role in the treatment and/or detection of developmental disorders associated with the developing embryo.

FEATURES OF PROTEIN ENCODED BY GENE NO: 121

The translation product of this gene shares sequence homology with the human IRLB protein which is thought to be important in binding to a c-myc promoter element and thus regulating its transcription (See Accession No. gi|33969). This gene maps to

chromosome 1, and therefore, may be used as a marker in linkage analysis for chromosome 1.

This gene is expressed primarily in brain and breast and to a lesser extent in a variety of hematopoietic tissues and cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, cancer of the brain and breast; lymphoproliferative disorders; neurodegenerative diseases. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the CNS, breast, and immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the treatment and diagnosis of cancer of the brain, breast, and hematopoietic system. In addition, it may be useful for the treatment of neurodegenerative disorders, as well as disorders of the hematopoietic system, including defects in immune competency and inflammation. Protein, as well as, antibodies directed against the protein may show utility as a tumor marker and immunotherapy targets for the above listed tumors and tissues.

FEATURES OF PROTEIN ENCODED BY GENE NO: 122

The translation product of this gene shares sequence homology with an ATP synthase, a key component of the proton channel that is thought to be important in the translocation of protons across the membrane.

This gene is expressed primarily in T cell lymphoma.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, T cell lymphoma. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or

lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to ATP synthase indicates that polynucleotides and polypeptides corresponding to this gene are useful for the treatment of defects in proton transport, homeostasis, and metabolism, as well as the diagnosis and treatment of lymphoma. Because the gene is expressed in cells of lymphoid origin, the natural gene product may be involved in immune functions. Therefore it may be also used as an agent for immunological disorders including arthritis, asthma, immune deficiency diseases such as AIDS, and leukemia

FEATURES OF PROTEIN ENCODED BY GENE NO: 123

This gene maps to chromosome 15, and therefore, may be used as a marker in linkage analysis for chromosome 15.

This gene is expressed primarily in a variety of fetal tissues, including fetal liver, lung, and spleen, and to a lesser extent in a variety of blood cells, including eosinophils and T cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, cancer (abnormal cell proliferation); T cell lymphomas; and hematopoietic disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the fetus and immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the treatment and diagnosis of conditions involving cell proliferation. Expression of this gene in fetal tissues, as well as in a variety of blood cell lineages indicates that it may play a role in either cellular proliferation; apoptosis; or cell survival. Thus it may be useful in the management and

treatment of a variety of cancers and malignancies. In addition, its expression in blood cells suggest that it may play additional roles in hematopoietic disorders and conditions, and could be useful in treating diseases involving autoimmunity, immune modulation, immune surveillance, and inflammation..

FEATURES OF PROTEIN ENCODED BY GENE NO: 124

This gene is expressed primarily in placenta and to a lesser extent in pineal gland and rhabdomyosarcoma.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, developmental, endocrine, and female reproductive disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the [insert system where a related disease state is likely, e.g., immune], expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 357 as residues: Leu-69 to Val-76.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of disorders in development. Protein, as well as, antibodies directed against the protein may show utility as a tumor marker and immunotherapy targets for the above listed tumors and tissues.

FEATURES OF PROTEIN ENCODED BY GENE NO: 125

This gene is expressed primarily in benign prostatic hyperplasia.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of benign prostatic hyperplasia. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the reproductive

system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment and diagnosis of benign prostatic hyperplasia. Protein, as well as, antibodies directed against the protein may show utility as a tumor marker and immunotherapy targets for the above listed tumors and tissues.

FEATURES OF PROTEIN ENCODED BY GENE NO: 126

This gene is expressed primarily in apoptotic T-cells and to a lesser extent in suppressor T cells and ulcerative colitis.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases involving premature apoptosis, and immunological and gastrointestinal disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment and diagnosis of disorders involving inappropriate levels of apoptosis, especially in immune cell lineages. Because the gene is expressed in cells of lymphoid origin, the natural gene product may be involved in immune functions. Therefore it may be also used as an agent for immunological disorders including arthritis, asthma, immune deficiency diseases (such as AIDS), and leukemia.

FEATURES OF PROTEIN ENCODED BY GENE NO: 127

This gene is expressed primarily in Raji cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, inflammation and T cell autoimmune disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 360 as residues: Asp-23 to Gly-29.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment and diagnosis of inflammation and T cell autoimmune disorders. Because the gene is expressed in cells of lymphoid origin, the natural gene product may be involved in immune functions. Therefore it may be also used as an agent for immunological disorders including arthritis, asthma, immune deficiency diseases (such as AIDS), and leukemia.

FEATURES OF PROTEIN ENCODED BY GENE NO: 128

The translation product of this gene shares sequence homology with an *C. elegans* coding region C47D12.2 of unknown function (See Accession No. gnl|PID|e348986). One embodiment for this gene is the polypeptide fragments comprising the following amino acid sequence: EDDGFNRSIHEVILKNITWY SERVLTEISLGSLLILVVIRTIQYNMTRTRDKYLHTNCLAALANMSAQFRSLHQY AAQRIISLFSLLSKKHNKVLEQATQSLRGSLSSNDVPLPDYAQDLNVIEEVIRMM LEIINSCLTNSLHHNPNLVALLYKRDLFEQFRTHPSFQDIMQNIDLVISFFSSRLL QAGS (SEQ ID NO:657); EDDGFNRSIHEVILKNITWYSERVLTEISLGSLLILVV (SEQ ID NO:658); RTIQYNMTRTRDKYLHTNCLAALANMSAQFRSLHQYAAQ RIISLFSLLSKKHN (SEQ ID NO:659); KKHNKVLEQATQSLRGSLSSNDVPLPDY AQD (SEQ ID NO:661); SCLTNSLHHNPNLVYALLYKRDLFEQFRTHPSFQD IMQNIDLVISFFSSRLLQAGS (SEQ ID NO:660). An additional embodiment is the polynucleotide fragments encoding these polypeptide fragments. This gene maps to

chromosome 18, and therefore, may be used as a marker in linkage analysis for chromosome 18.

This gene is expressed primarily in smooth muscle and to a lesser extent in fetal liver.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, atherosclerosis and other cardiovascular and hepatic disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the circulatory system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of circulatory system disorders such as atherosclerosis, hypertension, and thrombosis . In addition, the tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the detection and treatment of liver disorders and cancers (e.g. hepatoblastoma, jaundice, hepatitis, liver metabolic diseases and conditions that are attributable to the differentiation of hepatocyte progenitor cells). In addition the expression in fetus would suggest a useful role for the protein product in developmental abnormalities, fetal deficiencies, pre-natal disorders and various would-healing models and/or tissue trauma.

FEATURES OF PROTEIN ENCODED BY GENE NO: 129

The translation product of this gene shares sequence homology with a ribosomal protein which is thought to be important in cellular metabolism, in addition to the *C.elegans* protein F40F11.1 which does not have a known function at the current time (See Accession No. gnl|PID|e244552). Preferred polypeptide fragments comprise the following amino acid sequence:
MADIQTERAYQKQPTIFQNKKRVLLGETGKEKLPRVTNKNIGLGFKDT PRRLLRGTYIDKKCPFTGNVSIRGRILSGVVTQDEDAEDHCHPPRLSALHPQVQ PLREAPQEHVCTPVPL LQGRPDR (SEQ ID NO:662); MKMQRTIVIRRDYLH

YIRKYNRFEKRHKNMSVHLSPCFRDVQIGDIVTVGECRPLSKTVRFNVLKVTK AAGTKKQFQKF (SEQ ID NO:663); MADIQTERAYQKQPTIFQNKKRVLLGET GK (SEQ ID NO:664); HCHPPRLSALHPQVQPLREAPQEHVCTPVPL LQGRPDR (SEQ ID NO:666); NIGLGFKDTPRRLLRGTYIDKKCPFTGNVSIRGRILSGVVTQ (SEQ ID NO:669); MKMQRTIVIRRDYLHYIRKYNRFEKRHKNMSVHLSP (SEQ ID NO:667); CFRDVQIGDIVTVGECRPLSKTVRFNVLKVTKAAGTKKQFQKF (SEQ ID NO:668). Also preferred are polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed primarily in Wilm's tumor and to a lesser extent in thymus and stromal cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases affecting RNA translation. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the Wilm's tumors, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 362 as residues: Thr-11 to Asp-20.

The tissue distribution and homology to a ribosomal protein indicates that polynucleotides and polypeptides corresponding to this gene are useful for diseases affecting RNA translation.

FEATURES OF PROTEIN ENCODED BY GENE NO: 130

The translation product of this gene shares sequence homology with a yeast DNA helicase which is thought to be important in global transcriptional regulation (See Accession No. gnl|PID|e243594). One embodiment for this gene is the polypeptide fragments comprising the following amino acid sequence: IFYDSDWNPTVDQQA MDRAHRLGQTKQVTVYRLICKGTIEERILQRAKEKSEIQRMVISG (SEQ ID NO:670); TRMIDLLEEYMVYRKHTYXRLDGSSKISERRDMVADFQNRNDI FVFLLSTRAGGLGINLTAXDTVHF (SEQ ID NO:671); TRMIDLLEEYMVYRK HTYXRLDGSSKISERRDM (SEQ ID NO:674); RRDMVADFQNRNDIFVFLL

STRAGGLGINLTAXDTVHF (SEQ ID NO:675) , IFYDSDWNPTVDQQAMD RAHRLGQTKQVTVYRLICKG (SEQ ID NO:676); RLICKGTIEERILQRAK EKSEIQRMVISG (SEQ ID NO:678). An additional embodiment is the polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed primarily in amygdala.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases and disorders of the brain. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the central nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to a DNA helicase indicates that polynucleotides and polypeptides corresponding to this gene are useful for diseases affecting RNA transcription, particularly developmental disorders and healing wounds since the later are though to approximate developmental transcriptional regulation.

FEATURES OF PROTEIN ENCODED BY GENE NO: 131

This gene is expressed primarily in prostate and to a lesser extent in amygdala and pancreatic tumors.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, prostate enlargement and gastrointestinal disorders, particularly of the pancreas and gall bladder. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the reproductive system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to

the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment and diagnosis of prostate diseases, including benign prostatic hyperplasia and prostate cancer. In addition, the tissue distribution in tumors of the pancreas indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and intervention of these tumors, in addition to other tissues where expression has been indicated. Protein, as well as, antibodies directed against the protein may show utility as a tumor marker and/or immunotherapy targets for the above listed tumors and tissues.

FEATURES OF PROTEIN ENCODED BY GENE NO: 132

This gene is expressed primarily in adult lung and to a lesser extent in hypothalamus.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, pulmonary diseases and neurological disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the pulmonary and respiratory systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of pulmonary and respiratory disorders such as emphysema, pneumonia, and pulmonary edema and emboli. In addition, the tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the detection/treatment of neurodegenerative disease states and behavioral disorders such as Alzheimer's Disease, Parkinson's Disease, Huntington's Disease, schizophrenia, mania, dementia, paranoia, obsessive compulsive disorder and panic disorder. In addition, the gene or gene product may also play a role in the treatment and/or detection of developmental

disorders associated with the developing embryo, sexually-linked disorders, or disorders of the cardiovascular system.

FEATURES OF PROTEIN ENCODED BY GENE NO: 133

This gene is expressed primariiy in human liver.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, cirrhosis of the liver and other hepatic disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the digestive system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of liver disorders such as cirrhosis, jaundice, and Hepatitus. Protein, as well as, antibodies directed against the protein may show utility as a tumor marker and/or immunotherapy targets for the above listed tissues.

FEATURES OF PROTEIN ENCODED BY GENE NO: 134

This gene is expressed primarily in fetal kidney and to a lesser extent in fetal liver and spleen.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, development and regeneration of liver and kidney and immunological disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the digestive and excretory systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or

another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 367 as residues: Pro-70 to Arg-77, Tyr-102 to Thr-107.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of diseases of the kidney and liver, such as cirrhosis, kidney failure, kidney stones, and liver failure, hepatoblastoma, jaundice, hepatitis, liver metabolic diseases and conditions that are attributable to the differentiation of hepatocyte progenitor cells. In addition the expression in fetus would suggest a useful role for the protein product in developmental abnormalities, fetal deficiencies, pre-natal disorders and various would-healing models and/or tissue trauma.

FEATURES OF PROTEIN ENCODED BY GENE NO: 135

This gene is expressed primarily in brain, bone marrow, and to a lesser extent in placenta, T cell, testis and neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neurodegenerative and immunological diseases and cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the nervous and immune systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 368 as residues: Met-1 to His-6.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the detection/treatment of neurodegenerative disease states and behavioral disorders such as Alzheimer's Disease, Parkinson's Disease, Huntingtons Disease, schizophrenia, mania, dementia, paranoia, obsessive compulsive disorder and panic disorder. In addition, the gene or gene product may also

play a role in the treatment and/or detection of developmental disorders associated with the developing embryo, or sexually-linked disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 136

Translatation product of this gene is homologous to the human WD repeat protein HAN11. Preferred polypeptide fragments comprise the following amino acid sequence:
MSLHGKRKEIYKYEAPWTVYAMNWSVRPDKRFRLALGSFVEEYNNKVQLVG LDEESSEFICRNTFDHPYPTTKLMWIPDTKGVYPDLLATSGDYLRVWRVGETET RLECLLNNNKNSDFCAPLTSFDWNEVDPYLLGTSSIDTTCTIWGLETGQVLGRV NLVSGHVKTQLIAHDKEVYDIAFSRAGGGRDMFASVGADGSVRMFDLRHLEH STIIYEDPQHHPLLRLCWNKQDPNYLATMAMDGMEVVILDVRVPAHLXPGTTIE HVSMALLGPHIHPATSALQRMTTRLSSGTSSKCPEPLRTLSWPTQLXGEINNVQ WASTQPELSPSATTTAWRYSECSVGGAVPTRQGLLYFLPLPHPQS (SEQ ID NO:679); MSLHGKRKEIYKYEAPWTVYAMNWSVRPDKRFRLALGSFV EEYNNKVQLVGLDEESSEFICRNTFDHPYPTTKLMWIPDTKGVYPDLLATSGDY LRVWRVGETETRLECLLNNNKNSDFCAPLTSFDWNEVDPYLL (SEQ ID NO:680); SFDWNEVDPYLLGTSSIDTTCTIWGLETGQVLGRVNLVSGHVK TQLIAHDKEVYDIAFSRAGGGRDMFASVGADGSVRMFDLRHLEHSTIIYEDPQH HPLLRLCWNKQDPNYLATMAMDGMEVVILDVRVPAHLXPGTTI (SEQ ID NO:681); VGADGSVRMFDLRHLEHSTIIYEDPQHHPLLRLCWNKQDPNYLA TMAMDGMEVVILDVRVPAHLXPGTTIEHVSMALLGPHIHPATSALQRMTTRLS SGTSSKCPEPLRTLSWPTQLXGEINNVQWASTQPELSPSATTTAWRYSECSVG GAVPTRQGLLYFLPLPHPQS (SEQ ID NO:682). Also preferred are polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed primarily in placenta, embryo, T cell and fetal lung and to a lesser extent in endothelial, tonsil and bone marrow.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immunological and developmental diseases in addition to cancers. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or

cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 369 as residues: Gly-19 to Gln-28, Pro-36 to Phe-42.

The tissue distribution in tumors of colon, ovary, and breast origins indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and intervention of these tumors, in addition to other tumors where expression has been indicated. Protein, as well as, antibodies directed against the protein may show utility as a tumor marker and/or immunotherapy targets for the above listed tumors and tissues. Because the gene is expressed in cells of lymphoid origin, the natural gene product may be involved in immune functions. Therefore it may be also used as an agent for immunological disorders including arthritis, asthma, immune deficiency diseases such as AIDS, and leukemia.

FEATURES OF PROTEIN ENCODED BY GENE NO: 137

This gene is expressed primarily in TNF and INF induced epithelial cells, T cells and kidney.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, inflammatory conditions particularly inflammatory reactions in the kidney. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of renal system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 370 as residues: Thr-67 to Gly-72, Gln-132 to Ala-145, Arg-150 to Pro-157.

The tissue distribution indicates that the protein products of this gene are useful for treating the damage caused by inflammation of the kidney.

FEATURES OF PROTEIN ENCODED BY GENE NO: 138

This gene maps to chromosome 1, and therefore, may be used as a marker in linkage analysis for chromosome 1 (See Accession No. D63485).

This gene is expressed primarily in breast cancer and colon cancer and to a lesser extent in thymus and fetal spleen.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, cancers, especially of the breast and colon tissues. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution in tumors of colon and breast origins indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and intervention of these tumors, in addition to other tumors where expression has been indicated. Protein, as well as, antibodies directed against the protein may show utility as a tumor marker and/or immunotherapy targets for the above listed tumors and tissues.

FEATURES OF PROTEIN ENCODED BY GENE NO: 139

This gene maps to chromosome 17, and therefore, can be used as a marker for linkage analysis from chromosome 17.

This gene is expressed primarily in CD34 positive cells, and to lesser extent in activated T-cells and neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immunologically related diseases and hematopoietic disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system and hematopoietic system, expression of this gene at significantly higher or lower levels

may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution in CD34, T-cell and neutrophils indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment and diagnosis of hematopoietic disorders and immunologically related diseases, such as anemia, leukemia, inflammation, infection, allergy, immunodeficiency disorders, arthritis, asthma, immune deficiency diseases such as AIDS.

FEATURES OF PROTEIN ENCODED BY GENE NO: 140

This gene was recently cloned by another group, who called the gene KIAA0313 gene. (See Accession No. d1021609.) Preferred polypeptide fragments comprise the amino acid sequence: LYATATVISSPSTEXLSQDQGDRASLDAADSGRGSWTSCSSGSHDNIQTIQ HQRSWETLPFGHTHFDYSGDPAGLWASSSHMDQIMFSDHSTKYNRQNQSRES LEQAQSRASWASSTGYWGEDSEGDTGTIKRRGGKDVSIEAESSSLTSVTTEETK PVPMPAHIAVASSTTKGLIARKEGRYREPPPTPPGYIGIPITDFPEGHSHPARKP PDYNVALQRSRMVARSSDTAGPSSVQQPHGHPTSSRPVNKPQWHKXNESDPR LAPYQSQGFSTEEDEDEQVSAV (SEQ ID NO:683); HMDQIMFSDHSTKYNRQ NQSRESLEQAQSRASWASSTGYWGE (SEQ ID NO:684); SVTTEETKPVPMP AHIAVASSTTKGLIARKEGRYREPPPTPPGYIGIPITD (SEQ ID NO:685); and VALQRSRMVARSSDTAGPSSVQQPHGHPTSSRPVNKPQW HKXNESDPRLAPYQSQGF (SEQ ID NO:686). Also preferred are polynucleotide fragments encoding these polypeptide fragments. This gene maps to chromosome 4, and therefore, may be used as a marker in linkage analysis for chromosome 4 (See Accession No. AB002311).

This gene is expressed primarily in ovarian cancer, tumors of the Testis, brain, and colon.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, ovarian, testicle, brain and colon cancers. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the male and female reproductive systems.

expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution in tumors of colon, ovary, testis, and brain origins indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and intervention of these tumors, in addition to other tumors where expression has been indicated. Protein, as well as, antibodies directed against the protein may show utility as a tumor marker and/or immunotherapy targets for the above listed tumors and tissues.

FEATURES OF PROTEIN ENCODED BY GENE NO: 141

This gene is expressed primarily in spleen and colon cancer.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, colon cancer and immunological disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the gastrointestinal trace and immune systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution in tumors of colon, ovary, and breast origins indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and intervention of these tumors, in addition to other tumors where expression has been indicated. Protein, as well as, antibodies directed against the protein may show utility as a tumor marker and/or immunotherapy targets for the above listed tumors and tissues.

FEATURES OF PROTEIN ENCODED BY GENE NO: 142

Translation product is homologous to T cell translocation protein, a putative zinc finger factor (See Accession No. 340454), as well as to the G-protein coupled receptor TM5 consensus polypeptide (See Accession No. R50734). Preferred polypeptide fragments comprise the following amino acid sequence: CLLFVFVSLGMRCLFWTIVYNVLYLKHKCNTVLLCYHLCSI (SEQ ID NO:687); ACSKLIPAFEMVMRAKDNVYHLDCFACQLCNQRXCVGDKFFLKNNXXLCQT DYEEGLMKEGYAPXVR (SEQ ID NO:688). Also preferred are polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed primarily in fetal brain.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neurological disorders including brain cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the Central Nervous System, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the detection/treatment of neurodegenerative disease states and behavioral disorders such as Alzheimer's Disease, Parkinson's Disease, Huntingtons Disease, schizophrenia, mania, dementia, paranoia, obsessive compulsive disorder and panic disorder. In addition, the gene or gene product may also play a role in the treatment and/or detection of developmental disorders associated with the developing embryo.

FEATURES OF PROTEIN ENCODED BY GENE NO: 143

Translation product for this gene has significant homology to the Fas ligand, which is a cysteine-rich type II transmembrane protein/tumor necrosis factor receptor homolog. Mutations within this protein have been shown to result in generalized lymphoproliferative disease leading to the development of lymphadenopathy and autoimmune disease (See Medline Article No. 94185175). Preferred polypeptide

fragments comprise the following amino acid sequence: SALSEPGAPDRRRPCPESVPRRPDDEQWPPPTALCLDVAPLPPSS (SEQ ID NO:689). Also preferred are polynucleotide fragments encoding these polypeptide fragments (See Accession No. 473565).

This gene is expressed primarily in osteoblasts, lung, and brain.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, osteoblast-related, pulmonary, neurological, and immunological diseases. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the skeletal and nervous systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 376 as residues: Trp-33 to Thr-40, Lys-45 to Ile-63.

The tissue distribution in osteoblasts, lung, and brain combined with its homology to the Fas ligand indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and intervention of these tumors, in addition to other tumors where expression has been indicated. Protein, as well as, antibodies directed against the protein may show utility as a tumor marker and/or immunotherapy targets for the above listed tumors and tissues. Because the Fas ligand gene is known to be expressed in cells of lymphoid origin, the natural gene product may be involved in immune functions. Therefore it may be also used as an agent for immunological disorders including asthma, immune deficiency diseases such as AIDS and leukemia, and various autoimmune disorders including lupus and arthritis.

FEATURES OF PROTEIN ENCODED BY GENE NO: 144

This gene shares sequence homology with a 21.5 KD transmembrane protein in the SEC15-SAP4 intergenic region of yeast. (See Accession No. 1723971.) Preferred polypeptide fragments comprise the amino acid sequence: AHASESGERWWACCGVRFGLRSIEAIGRSCCHDGPGGLVANRGRRFKWAIEL SGPGGGSRGRSDRGSGQGDSLYPVGYLDKQVPDTSVQETDRILVEKRCWDIAL

GPLKQIPMNLFIMYMAGNTISIFPTMMVCMMAWRPIQALMAISATFKMLESSSQ KFLQGLVYLIGNLMGLALAVYKCQSMGLLPTHASDWLAFIEPPERMEFSGG GLLL (SEQ ID NO:691); PVGYLDKQVPDTSVQETDRILVEKRCWDIALGPLKQ IPMNLFI (SEQ ID NO:693); and ATFKMLESSSQKFLQGLVYLIGNLMGLALAV YKCQSMGLLPTHASD (SEQ ID NO:692). Also preferred are polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed primarily in osteoclastoma, hemangiopericytoma, liver, lung.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, osteoclastoma, hemangiopericytoma, liver and lung tumors. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the above tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the lung and liver systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosing osteoclastoma, hemangiopericytoma, liver and lung tumors.

FEATURES OF PROTEIN ENCODED BY GENE NO: 145

Translation product of this gene shares homology with the glucagon-69 gene which may indicate this gene plays a role in regulating metabolism. (See Accession No. A60318) One embodiment for this gene is the polypeptide fragments comprising the following amino acid sequence: PTTKLDIMEKKKHIQIRFPSFYHKLVDSGRMRSKRETRREDSDTKHNL (SEQ ID NO:694). An additional embodiment is the polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed primarily in brain, kidney, colon, and testis.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are

not limited to, brain, kidney, colon, and testicular cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the male reproductive system, neurological, circulatory, and gastrointestinal systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution in tumors of brain, kidney, colon, and testis origins, indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and intervention of these tumors, in addition to other tumors where expression has been indicated. Protein, as well as, antibodies directed against the protein may show utility as a tumor marker and/or immunotherapy targets for the above listed tumors and tissues. The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the detection/treatment of neurodegenerative disease states and behavioral disorders such as Alzheimer's Disease, Parkinson's Disease, Huntingtons Disease, schizophrenia, mania, dementia, paranoia, obsessive compulsive disorder and panic disorder. In addition, the gene or gene product may also play a role in the treatment and/or detection of developmental disorders associated with the developing embryo, sexually-linked disorders, or disorders of the cardiovascular system.

FEATURES OF PROTEIN ENCODED BY GENE NO: 146

The translation product of this gene shares sequence homology with goliath protein which is thought to be important in the regulation of gene expression during development. Protein may serve as a transcription factor. One embodiment for this gene is the polypeptide fragments comprising the following amino acid sequence: TEHILAVMITELRGKDILSYLEKNISVQMTIAVGTRMPPKNFSRGSLVFVSISFIVLMIISSAWLIFYFIQKIRYTNARDRNQRRLGDAAKKAISKLTTRTVKKGDKETDPDFDHCAVCIESYKQNDVVRILPCKHVFHKSCVDPWLSEHCTCPMCKLNILKALGIV (SEQ ID NO:695); TEHILAVMITELRGKDILSYLEKNISVQMTIAVGTRMPPKNFSRGSLVFVSISFIVLM IISSAWLIFYF (SEQ ID NO:697); SISFIVLMIISSAWLIFYFIQKIRYTNARDRNQRRLGDAAKKAISKLTTRTVKKGDKE (SEQ ID NO:698); VKKGDKETDPDFDHCAVCIESYKQNDVVRILPCKHVFHKSCVDP

WLSEHCTCPMCKLNILKALGIV (SEQ ID NO:699). An additional embodiment is the polynucleotide fragments encoding these polypeptide fragments (See Accession No. 157535). Moreover, another embodiment is the polynucleotide fragments encoding these polypeptide fragments: MTHPGTEHIIAVMITELRGKDILSYLEKNISVQMTIAVGTRMPPKNFSRGS LVFVSISFIVLMIISSAWLIFYFIQKIRYTNARDRNQRRLGDAAKKAISKLTTRTV KKGDKETDPDFDHCAVCIESYKQNDVVRILPCKHVFHKSCVDPWLSEHCTCP MCKLNILKALGIVPNLPCTDNVAFDMERLTRTQAVNRRSALGDLAGDNSLGLE PLRTSGISPLPQDGELTPRTGEINIAVTKEWFIIASFGLLSALTLCYMIIRATASLN ANEVEWF (SEQ ID NO:696);MTHPGTEHIIAVMITELRGKDILSYLEKNISVQM TIAVGTRMPPKNFSRGSLVFVSISFIVLMIISSAWLIFYFIQKIRYTNARDRNQRR LGDAAKKAISKLTTRT (SEQ ID NO:700); AAKKAISKLTTRTVKKGDKE TDPDFDHCAVCIESYKQNDVVRILPCKHVFHKSCVDPWLSEHCTCPMCKLNIL KALGIVPNLPC (SEQ ID NO:701); TQAVNRRSALGDLAGDNSLGLEPLRTSGI SPLPQDGELTPRTGEINIAVTKEWFIIASFGLLSALTLCYMIIRATASLNANEVEW F (SEQ ID NO:702); PLHGVADHLGCDPQTRFFVPPNIKQWIALLQRGNCTF KEKISRAAFHNAVAVVIYNNKSKEEPVTMTHPGTEHIIAVMITELRGKDILSYLE KNISVQMTIAVGTRMPPKNFSRGSLVFVSISFIVLMIISSAWLIFYFIQKIRYTNA RDRNQRRLGDAAKKAISKLTTRTVKKGDKETDPDFDHCAVCIESYKQNDVVRI LPCKHVFHKSCVDPWLSEHCTCPMCKLNILKALGIVPNLPCTDNVAFDMERLT RTQAVNRRSALGDLAGDNSLGLEPLRTSGISPLPQDGELTPRTGEINIAVTKEW FIIASFGLLSALTLCYMIIRATASLNANEVEWF(SEQ ID NO:703); and HGVADHLGCDPQTRFFVPPNIKQWIALLQRGNCTFKEKISRAAFHNAVAVVIY NNKSKEE (SEQ ID NO:704). An additional embodiment is the polynucleotide fragments encoding these polypeptide fragments. When tested against Jurkat cell lines, supernatants removed from cells containing this gene activated the GAS pathway. Thus, it is likely that this gene activates immune cells through the JAKS/STAT signal transduction pathway.

This gene is expressed primarily in macrophage, breast, kidney and to a lesser extent in synovium, hypothalamus and rhabdomyosarcoma.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, schizophrenia and cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune and neural system, expression of this gene at

significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to zinc finger protein indicates that polynucleotides and polypeptides corresponding to this gene are useful for the treatment of schizophrenia, kidney disease and other cancers. The tissue distribution in macrophage, breast, and kidney origins indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and intervention of tumors within these tissues, in addition to other tumors where expression has been indicated. Protein, as well as, antibodies directed against the protein may show utility as a tumor marker and/or immunotherapy targets for the above listed tumors and tissues. Because the gene is expressed in cells of lymphoid origin, the natural gene product may be involved in immune functions. Therefore it may be also used as an agent for immunological disorders including arthritis, asthma, immune deficiency diseases such as AIDS, and leukemia.

FEATURES OF PROTEIN ENCODED BY GENE NO: 147

The translation product of this gene shares sequence homology with HNP36 protein, an equilibrative nucleoside transporter, which is thought to be important in gene transcription as well as serving as an important component of the nucleoside transport apparatus (See Accession No. 1845345). One embodiment for this gene is the polypeptide fragments comprising the following amino acid sequence: MSGQGLAGFFASVAMICAIASGSELSESAFGYFITACAVIILTIICYLGLPRLEFYR YYQQLKLEGPGEQETKLDLISKGEEPRAGKEESGVSVSNSQPTNESHSIKAILK NISVLAFSVCFIFTITIGMFPAVTVEVKSSIAGSSTWERYFIPVSCFLTFNIFDWLG RSLTAVFMWPGKDSRWLPSWXLARLVFVPLLLLCNIKPRRYLTVVFEHDAWFI FFMAAFAFSNGYLASLCMCFGPKKVKPAEAETAEPSWPSSCVWVWHWGLFS PSCSGQLCDKGWTEGLPASLPVCLLPLPSARGDPEWSGGFFF (SEQ ID NO:705); MSGQGLAGFFASVAMICAIASGSELSESAFGYFITACAVIILTIIC YLGLPRLEFYRYYQQLKLE GPGEQETKLDLISKGEEPRAGKEESGVSVSNSQ PTNESHSI (SEQ ID NO:706); SGVSVSNSQPTNESHSIKAILKNISVLAFSVCFI FTITIGMFPAVTVEVKSSIAGSSTWERYFIPVSCFLTFNIFDWLGRS (SEQ ID NO:707),TIGMFPAVTVEVKSSIAGSSTWERYFIPVSCFLTFNIFDWLGRSLTAVF MWPGKDSRWLPSWXLARLVFVPLLLLCNIK PRRYLTVVFEHDA (SEQ ID NO:708); FGPKKVKPAEAETAEPSWPSSCVWVWHWGLFSPSCSGQLCDK

GWTEGLPASLPVCLLPLPSARGDPEWSGGFFF (SEQ ID NO:709). An additional embodiment is the polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed primarily in eosinophils and aortic endothelium and to a lesser extent in umbilical vein endothelial cell and thymus.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, hematopoietic disease. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the circular system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to HNP36 protein indicates that polynucleotides and polypeptides corresponding to this gene are useful for the treatment of blood neoplasias and other hematopoietic disease.

FEATURES OF PROTEIN ENCODED BY GENE NO: 148

This gene is expressed primarily in breast cancer cell lines, thymus stromal cells, and ovary.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, endocrine and female reproductive system diseases including breast cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the endocrine system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis and treatment of endocrine disorders. In addition, the tissue distribution in tumors of thymus, ovary, and breast origins indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and intervention of these tumors, in addition to other tumors where expression has been indicated. Protein, as well as, antibodies directed against the protein may show utility as a tumor marker and/or immunotherapy targets for the above listed tumors and tissues

FEATURES OF PROTEIN ENCODED BY GENE NO: 149

Translation product of this gene has homology to pmt1 and pmt 2, two conserved schizosaccharomyces pombe genes. One embodiment for this gene is the polypeptide fragments comprising the following amino acid sequence: DDDGFEIVPIEDPAKHRILDPEGLALGAVIASSKKAKRDLIDNSFNRYTFNEDEG ELPEWFVQEEKQHRIRQLPVGKKEVEHYRKRWREINARPIXXXXXXXXXXX XXXXXXLEQTRKKAEAVVNTVDIXRTRES (SEQ ID NO:710); DDDGFEIVPIEDPAKHRILDPEGLALGAVIASSKKAKRDLIDNSFNRYTF (SEQ ID NO:711); KRWREINARPIXXXXXXXXXXXXXXXXXLEQTRKKAE AVVNTVDIXRTRES (SEQ ID NO:712). An additional embodiment is the polynucleotide fragments encoding these polypeptide fragments (See Accession No. e1216734).

This gene is expressed primarily in retina and ovary and to a lesser extent in brreast cancer cell, epididymus and osteosarcoma.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neuronal growth disorders, cancer and reproductive system disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the neural and reproductive system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 382 as residues: Met-1 to Gly-7.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis or treatment of reproductive system disease and cancers.

FEATURES OF PROTEIN ENCODED BY GENE NO: 150

One embodiment for this gene is the polypeptide fragments comprising the following amino acid sequence: MIKDKGRARTALTSSQPAHLCPENPLLHLKAAVKEKKRNKKKKTIGSPKRIQS PLNNKLLNSPAKTLPGACGSPQKLIDGFLKHEGPPAEKPLEELSASTSGVPGLS SLQSDPAGCVRPPAPNLAGAVEFNDVKTLLREWITTISDPMEEDILQVVKYCTD LIEEKDLEKLDLVIKYMKRLMQQSVESVWNMAFDFILDNVQVVLQQTYGSTLK VT (SEQ ID NO:713); MIKDKGRARTALTSSQPAHLCPENPLLHLKAAVKE KKRNKKKKTIGSPKRIQ (SEQ ID NO:714); KRIQSPLNNKLLNSPAKT LPGACGSPQKLIDGFLKHEGPPAEKPLEELSASTSGVPGLSSLQSDPAGCVRPP APNLAGAVEFNDVKTLLREWITTISDPM (SEQ ID NO:715); TISDPMEEDILQVVKYCTDLIEEKDLEKLDLVIKYMKRLMQQSVE SVWNMAFDFILDNVQVVLQQTYGSTLKVT (SEQ ID NO:716). An additional embodiment is the polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed primarily in 12 week embryo and to a lesser extent in hemangiopericytoma and frontal cortex.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, growth disorders and hemangiopericytoma. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the circular and neural system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 383 as residues: Leu-4 to Lys-11.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the treatment of growth disorders, hemangiopericytoma and other soft tissue tumors.

FEATURES OF PROTEIN ENCODED BY GENE NO: 151

The translation product of this gene has been found to have homology to a human DNA mismatch repair protein PMS3. Preferred polypeptide fragments comprise the following amino acid sequence: FCHDCKFPEASPAMNCEP (SEQ ID NO:717). Also preferred are polynucleotide fragments encoding these polypeptide fragments (See Accession No. R95250).

This gene is expressed primarily in neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, lymphoma, immunodeficiency diseases, and cancers resulting from genetic instability. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 384 as residues: Met-1 to Lys-6.

The tissue distribution in neutrophils and the sequence homology indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis of Hodgkin's lymphoma, since the elevated expression and secretion by the tumor mass may be indicative of tumors of this type. Additionally the gene product may be used as a target in the immunotherapy of the cancer. Because the gene is expressed in cells of lymphoid origin, the natural gene product may be involved in immune functions. Therefore it may be also used as an agent for immunological disorders including arthritis, asthma, immune deficiency diseases such as AIDS, and leukemia. Furthermore, its homology to a known DNA repair protein would suggest gene may be useful in establishing cancer predisposition and prevention in gene therapy applications.

FEATURES OF PROTEIN ENCODED BY GENE NO: 152

This gene is expressed primarily in neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a

biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, infectious diseases and lymphoma. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the treatment of inflammation and infectious diseases.

FEATURES OF PROTEIN ENCODED BY GENE NO: 153

One embodiment for this gene is the polypeptide fragments comprising the following amino acid sequence: MASSVPAGGHTRAGGIFLIGKLDLEASLFKSFQWLPFVLRKKC NFFCWDSSAHSLPLHPLSASCSAPACHASDTHLLYPSTRALCPSIFAWLVAPHS VFRTNAPGPTPSSQSSPVFPVFPVSFMALIVCXLVCC (SEQ ID NO:720); MASSVPAGGHTRAGGIFLIGKLDLEASLFKSFQWLPFVLRKKCNFFCWDSSAH SLPLHPLSASCSAPACHA (SEQ ID NO:721);FAWLVAPHSVFRTNAPGPTPS SQSSPVFPVFPVSFMALIVCXLVCC (SEQ ID NO:722). An additional embodiment is the polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed primarily in neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, inflammation and infectious disease. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred

epitopes include those comprising a sequence shown in SEQ ID NO: 386 as residues: Ser-11 to Pro-17.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the treatment of infectious diseases and inflammation.

FEATURES OF PROTEIN ENCODED BY GENE NO: 154

This gene is expressed in multiple tissues including ovary, uterus, adipose tissue, brain, and the liver.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, uterine, ovarian, brain, and liver cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the female reproductive system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution of this gene indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnostic or therapeutic uses in the treatment of the female reproductive system, obesity, and liver disorders, particularly cancer in the above tissues.

FEATURES OF PROTEIN ENCODED BY GENE NO: 155

This gene maps to chromosome 3, and therefore, may be used as a marker in linkage analysis for chromosome 3 (See Accession No. D87452).

This gene is expressed in multiple tissues including brain, aortic endothelial cells, smooth muscle, pituitary, testis, melancytes, spleen, nertrophils, and placenta.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immunological disorders including immunodeficiencies, cancers of the brain and the female reproductive system. as well as cardiovascular disorders, such as

atherosclerosis and stroke. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the central nervous and immune systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution suggest that polynucleotides and polypeptides corresponding to this gene are useful in treatment/detection of disorders in the nervous system, including schizophrenia, neurodegeneration, neoplasia, brain cancer as well as cardiovascular and female reproductive disorders including cancer within the above tissues.

FEATURES OF PROTEIN ENCODED BY GENE NO: 156

The translation product of this gene shares sequence homology with the human gene encoding cytochrome b561 (See Accession No. P10897). Cytochrome b561 is a transmembrane electron transport protein that is specific to a subset of secretory vesicles containing catecholamines and amidated peptides. This protein is thought to supply reducing equivalents to the intravesicular enzymes dopamine-beta-hydroxylase and alpha-peptide amidase. Preferred polypeptides of the invention comprise the amino acid sequence:
MAMEGYWRFLALLGSALLVGFLSVIFALVWVLHYREGLGWDGSALEFNWHP
VLMVTGFVFIQGIAIIVYRLPWTWKCSKLLMKSIHAGLNAVAAILAIISVVAVFE
NHNVNNIANMYSLHSWVGLIAVICYLLQLLSGFSVFLLPWAPLSLRAFLMPIHV
YSGIVIFGTVIATALMGLTEKLIFSLRDPAYSTFPPEGVFVNTLGLLILVFGALIF
WIVTRPQWKRPKEPNSTILHPNGGTEQGARGSMPAYSGNNMDKSDSEL
NSEVAARKRNLALDEAGQRSTM (SEQ ID NO:724); as well as antigenic fragments of at least 20 amino acids of this gene and/or biologically active fragments. Also preferred are polynucleotide fragments encoding these polypeptide fragments.

This gene is expressed primarily in anergic T-cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immune system and metabolism related diseases. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological

probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that the protein product or RNA of this gene is useful for treatment or diagnosis of immune system and metabolic diseases or conditions including Tay-Sachs disease, phenylketonuria, galactosemia, various porphyrias, and Hurler's syndrome.

FEATURES OF PROTEIN ENCODED BY GENE NO: 157

The translation product of this gene shares sequence homology with collagen which is important in mammalian development. This gene also shows sequence homology with bcl-2. (See Accession No. P80988.) Preferred polypeptide fragments comprise the amino acid sequence: PGRAGPSPGLSLQLPAEPGHPAGNLAPL TSRPQPLCRIPAVPG (SEQ ID NO:725). Also preferred are polynucleotide sequences encoding this polypeptide fragment.

This gene is expressed primarily in HL-60 tissue culture cells and to a lesser extent in liver, breast, and uterus.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immunological diseases, hereditary disorders involving the MHC class of immune molecules, as well as developmental disorders and reproductive disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune and reproductive system expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those

comprising a sequence shown in SEQ ID NO: 390 as residues: Ser-39 to Gly-46, Leu-49 to Ala-62.

The tissue distribution and homology to collagen indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of hereditary MHC disorders and particularly autoimmune disorders including rheumatoid arthritis, lupus, scleroderma, and dermatomyositis, as well as many reproductive disorders, including cancer of the uterus, and breast tissues.

FEATURES OF PROTEIN ENCODED BY GENE NO: 158

This gene is expressed primarily in the amygdala region of the brain.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, a variety of brain disorders, particularly those effecting mood and personality. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the brain and central nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment and/or diagnosis of a variety of brain disorders, particularly bipolar disorder, unipolar depression, and dementia.

FEATURES OF PROTEIN ENCODED BY GENE NO: 159

This gene is expressed in a variety of tissues and cell types including brain, smooth muscle, kidney, salivary gland and T-cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, cancers of a variety of organs including brain, smooth muscle, kidney, salivary gland and T-cells and cardiovascular disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders

of the above tissues or cells, particularly of the central nervous, urinary, salivary, digestive, and immune systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level. i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution in brain, smooth muscle, and T-cells indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis of various neurological, and cardiovascular disorders, but not limited to cancer within the above tissues. Additionally the gene product may be used as a target in the immunotherapy of the cancer. Because the gene is expressed in cells of lymphoid origin, the natural gene product may be involved in immune functions. Therefore it may be also used as an agent for immunological disorders including arthritis, asthma, immune deficiency diseases such as AIDS, and leukemia.

FEATURES OF PROTEIN ENCODED BY GENE NO: 160

The translation product of this gene shares sequence homology with collagen which is thought to be important in cellular interactions, extracellular matrix formation, and has been found to be an identifying determinant in autoimmune disorders. Moreover, this gene shows sequence homology with the yeast protein, Sls1p, an endoplasmic reticulum component, involved in the protein translocation process in Yeast Yarrowia lipolytica. (See Accession No. 1052828; see also J. Biol. Chem. 271, 11668-11675 (1996).) With mouse, this same region shows sequence homology with the heavy chain of kinesin. (See Accession No. 2062607.) Recently, suppression of the heavy chain of kinesin was shown to inhibits insulin secretion from primary cultures of mouse beta-cells. (See Endocrinology 138 (5), 1979-1987 (1997).) Moreover, kinesin was found associated with drug resistance and cell immortalization. (See 468355.) Thus, it is likely that this gene also act as a genetic suppressor elements.

This gene is expressed primarily in the greater omentum and to a lesser extent in a variety of organs and cell types including gall bladder, stromal bone marrow cells, lymph node, liver, testes, pituitary, and thymus.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, disorders of the endocrine, gastrointestinal, and immunological systems, including autoimmune disorders and cancers in a variety of organs and cell types.

Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune and gastrointestinal systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 393 as residues: Asn-27 to Leu-47, Gln-81 to Lys-88, Asp-93 to Lys-102, Asn-107 to Leu-116, Met-129 to Glu-141, Glu-150 to Asp-157, Lys-176 to Glu-185, Glu-333 to Tyr-349, Cys-393 to Leu-403, Gln-423 to Gly-429.

The tissue distribution in within various endocrine and immunological tissues combined with the sequence homology to a conserved collagen motif indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis of various autoimmune disorders including, but not limited to, rheumatoid arthritis, lupus erthyematosus, scleroderma, dermatomyositis Because the gene is expressed in cells of lymphoid origin, the natural gene product may be involved in immune functions. Therefore it may be also used as an agent for immunological disorders including arthritis, asthma, immune deficiency diseases such as AIDS, and leukemia.

FEATURES OF PROTEIN ENCODED BY GENE NO: 161

This gene has homology to the tissue inhibitor of metalloproteinase 2. Such inhibitors are vital to proper regulation of metalloproteins such as collagenases (See Accession No. P16368). In addition, this gene maps to chromosome 17, and therefore, may be used as a marker in linkage analysis for chromosome 17 (See Accession No. P16368).

This gene is expressed primarily in several types of cancer including osteoclastoma, chondrosarcoma, and rhabdomyosarcoma and to a lesser extent in several non-malignant tissues including synovium, amygdala, testes, placenta.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, various types of cancer, particularly cancers of bone and cartilage, as well as various autoimmune disorders. Similarly, polypeptides and antibodies directed

to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the musculoskeletal system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution in various cancers and the sequence homology to a collagenase inhibitor indicates that polynucleotides and polypeptides corresponding to this gene are useful for detection of various autoimmune disorders such as rheumatoid arthritis, lupus, scleroderma, and dermatomyositis. Therefore it may be also used as an agent for immunological disorders including arthritis, asthma, immune deficiency diseases such as AIDS, and leukemia.

FEATURES OF PROTEIN ENCODED BY GENE NO: 162

This gene is homologous to the mitochondrial ATP6 gene and therefore is likely a homolog of this gene family (See Accession No. X76197).

This gene is expressed primarily in brain tissue.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, a variety of brain disorders, including Down's syndrome, depression, Schizophrenia, and epilepsy. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the central nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution in brain tissue indicates this gene is useful for diagnosis of various neurological disorders including, but not limited to, brain cancer. Additionally the gene product may be used as a target in the immunotherapy of cancer in the brain as well as for the diagnosis of metabolic disorders such as obesity Tay-Sachs disease, phenylketonuria and Hurler's Syndrome.

FEATURES OF PROTEIN ENCODED BY GENE NO: 163

This gene is expressed primarily in placenta, neutrophils, and microvascular endothelial cells and to a lesser extent in multiple tissues including brain, prostate, spleen, thymus, and bone.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neutropenea and other diseases of the immune system. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution in placenta indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis various female reproductive disorders. Additionally the gene product may be used as a target in the immunotherapy of various cancers. Because the gene is expressed in some cells of lymphoid and endocrine origin, the natural gene product may be involved in immune functions and metabolism regulation, respectively. Therefore it may be also used as an agent for immunological disorders including arthritis, asthma, immune deficiency diseases such as AIDS, and leukemia.

FEATURES OF PROTEIN ENCODED BY GENE NO: 164

This gene is expressed primarily in neutrophils, monocytes, bone marrow, and fetal liver.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immune system disorders including, but not limited to, autoimmune disorders such as lupus, and immunodeficiency disorders . Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders

of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution in various immune system tissue indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis of various immunological disorders such as Hodgkin's lymphoma, arthritis, asthma, immune deficiency diseases such as AIDS, and leukemia.

FEATURES OF PROTEIN ENCODED BY GENE NO: 165

The translation product of this gene shares sequence homology with dystrophin which is thought to be defective in both Duchene and Becker Muscular Dystrophy. Preferred polypeptide fragments comprise the following amino acid sequence: MKLLGECSSSIDSVKRLEHKLKEEEESLPGFVNLHSTETQTAGVIDRWELLQAQALSKELRMKQNLQKWQQFNSDLNSIWAWLGDTEEELEQLQRLELSTDIQTIELQIKKLKELQKAVDHRKAIILSINLCSPEFTQADSKESRDLQDRLXQMNGRWDRVCSLLEEWRGLLQDALMQCQGFHEMSHGLLLMLENIDRRKNEIVPIDSNLDAEILQDHHKQLMQIKHELLESQLRVASLQDMSCQLLVNAEGTDCLEAKEKVHVIGNRLKLLLKEVSRHIKELEKLLDVSSSQQDLSSWSSADELDTSGSVSPXSGRSTPNRQKTPRGKCSLSQPGPSVSSPHSRSTKGGSDSSLSEPXPGRSGRGFLFRVLRAALPLQLLLLLLIGLACLVPMSEEDYSCALSNNFARSFHPMLRYTNGPPPL (SEQ ID NO:726); MKLLGECSSSIDSVKRLEHKLKEEEESLPGFVNLHSTETQTAGVIDRWELLQAQALSKELRMKQNLQKWQQFNSDLNSIWAWLGDTEEELEQLQRLELSTDIQTIELQIK (SEQ ID NO:727); KLKELQKAVDHRKAIILSINLCSPEFTQADSKESRDLQDRLXQMNGRWDRVCSLLEEWRGLLQDALMQCQGFHEMSHGLLLMLENIDRRKNEIVPIDSNLDAEILQDHHKQLMQIKHELLESQLRVASLQDMSCQL (SEQ ID NO:728); QDMSCQLLVNAEGTDCLEAKEKVHVIGNRLKLLLKEVSRHIKELEKLLDVSSSQQDLSSWSSADELDTSGSVSPXSGRSTPNRQKTPRGKCSLSQPGPSVSSPHS (SEQ ID NO:729); DSSLSEPXPGRSGRGFLFRVLRAALPLQLLLLLLIGLACLVPMSEEDYSCALSNNFARSFHPMLRYTNGPPPL (SEQ ID NO:730). Also preferred are polynucleotide fragments encoding these polypeptide fragments. Furthermore, this gene maps to chromosome 6, and therefore, may be used as a marker in linkage analysis for chromosome 6 (See Accession No. N62896).

This gene is expressed in numerous tissues including the heart, kidney, and brain.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, musculoskeletal disorders including Muscular Dystrophy and cardiovascular diseases. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the muscle tissues, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to dystrophin indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis and treatment of Muscular Dystrophy and other muscle disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 166

This gene is expressed primarily in human cerebellum.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases of the central nervous system, including Alzheimer's Disease, Parkinson's Disease, ALS, and mental illnesses. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the central nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 399 as residues: Pro-20 to Gly-26, Leu-37 to Pro-42, His-57 to Gly-63.

The tissue distribution indicates that the protein products of this gene are useful for treatment/diagnosis of diseases of the central nervous system and may protect or

enhance survival of neuronal cells by slowing progression of neurodegenerative diseases.

FEATURES OF PROTEIN ENCODED BY GENE NO: 167

Preferred polypeptides encoded by this gene comprise the following amino acid sequence:
MKLLICGNYLAPSHSESSRRCCLLCFYPLCLEINFGMKVFLSMPFLVLFQ
SLIQED (SEQ ID NO:731). Polynucleotides encoding such polypeptides are also provided. This gene is believed to reside on chromosome 15. Therefore polynucleotides derived from this gene are useful in linkage analysis as chromosome 15 markers.

This gene is expressed primarily in human testes tumor and to a lesser extent in normal human testes.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases of the testes, particularly cancer, and other reproductive disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the male reproductive tissues, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that the protein products of this gene are useful for treatment/diagnosis of testicular diseases including cancers.

FEATURES OF PROTEIN ENCODED BY GENE NO: 168

This gene is expressed primarily in fetal liver.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, conditions affecting hematopoietic development and metabolic diseases. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the

hepatic system, and fetal hematopoietic system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 401 as residues: His-7 to Trp-17, Leu-19 to Lys-27, Pro-33 to Gly-44, Lys-68 to Gly-74, Lys-85 to Cys-95.

The tissue distribution indicates that the protein products of this gene are useful for treatment/diagnosis of diseases of the developing liver and hematopoietic system, and act as a growth differentiation factor for hematopoietic stem cells.

FEATURES OF PROTEIN ENCODED BY GENE NO: 169

The polypeptide encoded by this gene is believed to be a membrane bound receptor. The extracellular domain of which is expected to consist of the following amino acid sequence:
RILLVKYSANEENKYDYLPTTVNVCSELVKLVFCVLVSFCVIKKDHQSRNLKY
ASWKEFSDFMKWSIPAFLYFLDNLIVFYVLSYLQPAMAVIFSNFSIITTALLFRIV
LKXRLNWIQWASLLTLFLSIVALTAGTKTLQHNLAGRGFHHDAFFSPSNSCLL
FRNECPRKDNCTAKEWTFPEAKWNTTARVFSHIRLGMGHVLIIVQCFISSMANI
YNEKILKEGNQLTEXIFIQNSKLYFFGILFNGLTLGLQRSNRDQIKNCGFFYGH
S (SEQ ID NO:732). Thus, preferred polypeptides encoded by this gene comprise the extracellular domain as shown above. It will be recognized, however, that deletions of either end of the extracellular domain up to the first cysteine from the N-terminus and the first cysteine of the C-terminus, is expected to retain the biological functions of the full-length extracellular domain because the cysteines are thought to be responsible for providing secondary structure to the molecule. Thus, deletions of one or more amino acids from either end (or both ends) of the extracellular domain are contemplated. Of course, further deletions including the cysteines are also contemplated as useful as such polypeptides is expected to have immunological properties such as the ability to evoke and immune response. Polynucleotides encoding all of the foregoing polypeptides are provided.

This gene is expressed primarily in human osteoclastoma and to a lesser extent in hippocampus and chondrosarcoma.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are

not limited to, cancers, particularly those of the bone and connective tissues. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the skeletal system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 402 as residues: Met-1 to Cys-6, Ala-41 to Tyr-49, Lys-76 to Lys-84.

The tissue distribution indicates that the protein products of this gene are useful for diagnosis of cancers of the bone and connective tissues, and may act as growth factors for cells involved in bone or connective tissue growth.

FEATURES OF PROTEIN ENCODED BY GENE NO: 170

Preferred polypeptides encoded by this gene comprising the following amino acid sequence: NSVPNLQTLAVLTEAIGPEPAIPRXPREPPVATSTPATPSAGPQPLPTGTV LVPGGPAPPCLGEAWALLLPPCRPSLTSCFWSPRPSPWKETGV (SEQ ID NO:733). Polynucleotides encoding such polypeptides are also provided herein.

This gene is expressed primarily in hematopoietic progenitor cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases of the blood including cancer and autoimmune disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the blood/circulatory system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 403 as residues: Gln-4 to His-10, Pro-25 to His-32.

The tissue distribution indicates that the protein products of this gene are useful for diagnosis of diseases involving growth differentiation of hematopoietic cells.

FEATURES OF PROTEIN ENCODED BY GENE NO: 171

Preferred polypeptides encoded by this gene comprise the following amino acid sequences: ALQLAFYPDAVEEWLEENVHPSLQRLQXLLQDLSEVSAPP (SEQ ID NO:734); and/or CHPPALAGTLLRTPEGRAHARGLLLEAGGA (SEQ ID NO:735). Polynucleotides encoding such polypeptides are also provided. The protein product of this gene shares sequence homology with metallothionines. Thus, polypeptide encoded by this gene are expected to have metallothionine activity, such activities are known in the art and described elsewhere herein.

This gene is expressed primarily in kidney cortex.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases of the kidney including cancer and renal dysfunction. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the renal system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 404 as residues: Ser-47 to Gln-52.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment/diagnosis of diseases of the kidney including kidney failure.

FEATURES OF PROTEIN ENCODED BY GENE NO: 172

This gene is expressed primarily in 12 week old early stage human.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, developmental abnormalities. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for

differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the developing embryo, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 405 as residues: Gln-31 to Thr-43, Gly-51 to Ser-58, Pro-65 to Pro-72.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment/diagnosis of developmental problems with fetal tissue. The gene may be involved in vital organ development in the early stage, especially hematopoiesis, cardiovascular system, and neural development.

FEATURES OF PROTEIN ENCODED BY GENE NO: 173

The translation product of this gene shares sequence homology with TGN38, an integral membrane protein previously shown to be predominantly localized to the trans-Golgi network (TGN) of cells.

This gene is expressed primarily in developing embryo and to a lesser extent in cancer tissues including lymphoma, endometrial, protate and colon.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, developmental abnormalities and cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the developing fetus, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 406 as residues: His-65 to Ser-72, Pro-82 to Gly-91, Pro-98 to Glu-118, Ser-126 to Gly-166, Pro-180 to Asp-188, Tyr-209 to Lys-214, Gln-220 to Leu-228.

The tissue distribution and homology to an integral membrane protein indicates that polynucleotides and polypeptides corresponding to this gene are useful for

diagnosis of cancers and developmental abnormalities where aberrant expression relates to an abnormality.

FEATURES OF PROTEIN ENCODED BY GENE NO: 174

The translation product of this gene shares sequence homology with a dnaJ heat shock protein from E. coli which is allelic to sec63, a gene that affects transit of nascent secretory proteins across the endoplasmic reticulum in yeast.

This gene is expressed primarily in Hodgkin's lymphoma and to a lesser extent in testes.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 407 as residues: Thr-13 to Trp-21, Arg-74 to Asp-81.

The tissue distribution and homology to dnaJ indicates that polynucleotides and polypeptides corresponding to this gene are useful as a diagnostic for cancer including Hodgkin's lymphoma.

FEATURES OF PROTEIN ENCODED BY GENE NO: 175

This gene is expressed primarily in endothelial cells and to a lesser extent in bone marrow stromal cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, diseases involving angiogenic abnormalities including diabetic retinopathy, macular degeneration, and other diseases including arteriosclerosis and cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell

type(s). For a number of disorders of the above tissues or cells, particularly of the vascular system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that the protein products of this gene are useful for treating diseases where an increase or decrease in angiogenesis is indicated and as a factor in the wound healing process.

FEATURES OF PROTEIN ENCODED BY GENE NO: 176

The translation product of this gene shares sequence homology with MAT8 (mouse) which is thought to be important in regulating chloride conductance in cells (particularly in the breast) by modulating the response mediated by cAMP and protein kinase C to extracellular signals.

This gene is expressed primarily in amniotic cells and hematopoeitic cells including macrophages, Neutrophils, T cells, TNF induced aortic endothelium and to a lesser extent in testes, TNF induced epithelial cells, and smooth muscle.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, inflammatory responses mediated by T cells, macrophages, and/or neutrophils particularly those involving TNF, and also cancer. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 409 as residues: Thr-19 to Ala-33, Leu-54 to Asp-82, Pro-89 to Ala-97, Pro-100 to Lys-125, Ser-127 to Phe-135, Gly-164 to Leu-169, Cys-173 to Arg-178.

The tissue distribution and homology to mat-8 indicates that polynucleotides and polypeptides corresponding to this gene are useful for modifying inflammatory

responses to cytokines such as TNF and thus modifying the duration and/or severity of inflammation. Polynucleotides and polypeptides derived from this gene are thought to be useful in the diagnosis and treatment of cancer.

FEATURES OF PROTEIN ENCODED BY GENE NO: 177

This gene is expressed primarily in endothelial cells.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, vascular restenosis. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the vascular system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treating diseases associated with vascular response to injury such as vascular restenosis following angioplasty..

FEATURES OF PROTEIN ENCODED BY GENE NO: 178

One embodiment of the claimed invention comprises: MRPDWKAGAGPGGPPQKPAPSSQRKPPARPSAAAAAIAVAAAEEERRLRQRNRLRLEEDKPAVERCLEELVFGDVENDEDALLRRLRGPRVQEHEDSGDSEVENEAKGNFPPQKKPVWVDEEDEDEEMVDMMNNRFRKDMMKNASESKLSKDNLKKRLKEEFQHAMGGVPAWAETTKRKTSSDDESEEDEDDLLQRTGNFISTSTSLPRGILKMKNCQHANAERPTVARISICAVPSRCTDCDGCWD (SEQ ID NO:737); or CLEELVFGDVENDEDALLRRLRGPRVQEHEDSGDSEVENEAKGNFPPQKKPVWVDEEDEDEEMVDMMNNRFRKDMMKNASESKLSKDNLKKRLKEEFQHAMGGVPAWAETTKRKTSSDDESEEDEDDLLQRTGNFISTSTSLPRGILKMKNCQHANAERPTVARISICAVPSRCTDCDGC (SEQ ID NO: 738). LKEKIVRSFEVSPDGSFLLINGIAGYLHLLAMKTKELIGSMKINGRVAASTFSSDSKKVYASSGDGEVYVWDVNSRKCLNRFVDEGSLYGLSIATSRNGQYVACGSNCGVVNIYNQDSCLQETNPKPIKAIMNLVTGVTSLTFNPTTEILAIASEKMKEAVRLVHLPSCTVFSNFPVIKNKNISHVHTMDFSPRSGYFALGNEKGKALMYRLHHYSDF (SEQ ID NO:739);

and/or KINGRVAASTFSSDSKKVYASSGDGEVYVWDVNSRKCLNRFVDEGSL YGLSLATSRNGQYVACGSNCGVVNIYNQDSCLQETNPKPIKAIMNLVTGVTSLT FNPTTEILAIASEKMKEAVRLVHLPSCTVFSNFPVIKNKNISHVHTMDFSPRSG YFALGNEKGKAL (SEQ ID NO:740).

This gene is expressed primarily in epidydimus and endometrial tumors and to a lesser extent in T cell lymphoma and cell lines derived from colon cancer.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, tumors of the reproductive organs including testis and endometrial cells. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the reproductive system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 411 as residues: Ser-67 to Lys-72, Val-87 to Leu-93, Tyr-128 to Pro-141, Asp-204 to Gly-210.

The tissue distribution indicates that the protein products of this gene are useful for treating tumors of the endometrium or epithelial tumors of the reproductive system.

FEATURES OF PROTEIN ENCODED BY GENE NO: 179

Preferred polypeptides encoded by this gene comprise the following amino acid sequence:

MRILQLILLALATGLVGGETRIIKGFECKLHSQPWQAALFEKTRLLCGATLIAPR WLLTAAHCLKPRYIVHLGQHNLQKEEGCEQTRTATESFPHPGFNNSLPNKDH RNDIMLVKMASPVSITWAVRPLTLSSRCVTAGTSCSFPAGAARPDPSYACLTPC DAPTSPSLSTRSVRTPTPATSQTPWCVPACRKGARTPARVTPGALWSVTSLFKA LSPGARIRVRSPESLVSTRKSANMWTGSRRR (SEQ ID NO:741); ETRIIKGFEC KLHSQPWQAALFEKTRLLCGATLIAPRWLLTAAHCLKPRYIVHLGQHNLQKEE GCEQTRTATESFPHPGFNNSLPNKDHRNDIMLVKMASPVSITWAVRPLTLSSR CVTAGTSCSFPAGAARPDPSYACLTPCDAPTSPSLSTRSVRTPTPATSQTPWCVP ACRKGARTPARVTPGALWSVTSLFKALSPGARIRVRSPESLVSTRKSANMWTG

SRRR (SEQ ID NO:742); or CKLHSQPWQAALFEKTRLLCGATLIAPRWLLT AAHCLKPRYIVHLGQHNLQKEEGCEQTRTATESFPHPGFNS (SEQ ID NO:743). The translation product of this gene shares sequence homology with neuropsin a novel serine protease which is thought to be important in modulating extracellular signaling pathways in the brain. Owing to the structural similarity to other serine proteases the protein products of this gene are expected to have serine protease activity which may be assayed by methods known in the art and described elsewhere herein.

This gene is expressed primarily in endometrial tumor and to a lesser extent in colon cancer, benign hypertrophic prostate, and thymus.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, cancers of the endometrium or colon and benign hypertrophy of the prostate. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the urogenital or reproductive systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 412 as residues: Gly-12 to Ser-22, Pro-34 to Ser-53.

The tissue distribution and homology to serine proteases indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosing or treating hperproliferative disorders such as cancer of the endometrium or colon and hyperplasia of the prostate.

FEATURES OF PROTEIN ENCODED BY GENE NO: 180

Preferred polypeptide encoded by this gene comprise the following amino acid sequence: VLQGRYFSPILEMRRLRPEGXXNLPGGSRAQKEPRQDLTLVLWPHC PHFAMTRSYVPTKQCMVQGSFYCIFIFKGPVQNWC (SEQ ID NO:744). Polynucleotides encoding such polypeptide are also provided.

This gene is expressed primarily in fetal brain

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, identifying and expanding stem cells in the CNS. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that the protein products of this gene are useful for detecting and expanding stem cell populations in the (or of the) central nervous system.

FEATURES OF PROTEIN ENCODED BY GENE NO: 181

This gene is expressed primarily in early stage human brain and a stromal cell line.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, developmental abnormalities of the CNS. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the central nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 414 as residues: Gln-42 to Gln-47, Gln-54 to Pro-60.

The tissue distribution indicates that the protein products of this gene play a role in the development of the central nervous system. Therefore this gene and its products

are useful for diagnosing or treating developmental abnormalities of the central nervous system.

FEATURES OF PROTEIN ENCODED BY GENE NO: 182

Preferred polypeptides encoded by this gene comprise the following amino acid sequence: MPIIDQVNPELHDFMQSAEVGTIFALSWLITWFGHVLSDFRHVVRLYDFFLACHPLMPIYFAAVIVLYREQEVLDCDCDMASVHHLLSQIPQDLPYETLISRXETFLFSFPHPNLLGRPLPNSKLRGRQPLLSKTLSWHQPSRGLIWCCGSGXRGLLRPEDRTKDVLTKPRTNRFVKLAVMGLTVALGAAALAVVKSALEWAPKFQLQLFP (SEQ ID NO:745); or CPEFFIPATLPCPFVFAFTSEASSRAYLTQRGPGGLAQNLMPLPVGFWMGSLPPPWCWRKWVSEACSCFC (SEQ ID NO:746) These polypeptides are structurally similar to various TGF-beta family members. Thus, this polypeptide is expected to have a variety of activities in the modulation of cell growth and proliferation.

This gene is expressed primarily in osteoclastoma, microvascular endothelium, and bone marrow derived cell lines.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, hematological diseases particularly involving aberrant proliferation of stem cells. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 415 as residues: Ser-33 to Ala-39.

The tissue distribution indicates that the protein products of this gene is useful for treating disorders of the progenitors of the immune system. Applications include in vivo expansion of progenitor cells, ex vivo expansion of progenitor cells, or the treatment of tumors of the circulatory system, such as lymphomas.

FEATURES OF PROTEIN ENCODED BY GENE NO: 183

This gene maps to chromosome 17 and therefore, polynucleotides of the invention can be used in linkage analysis as a marker for chromosome 17. In specific embodiments, polypeptides of the invention comprise the sequence: GFGSVSAAGRRSGGTWQPVQ (SEQ ID NO:747); PGGLAVGSRWWSRSLT (SEQ ID NO:748); LEPSRQRRPRRRGGTSRPETDQRAKCWRQL (SEQ ID NO:749); and/or VCLRCQNRMEN (SEQ ID NO:750). In further specific embodiments, polypeptides of the invention comprise the sequence: MAACTARRPGR GQPLVVPVADXGPVAKAALCAAXAGAFSPASTTTTRRHLSSRNRPEGKVLETV GVFEVPKQNGKYETGQLFLHSIFGYRGVVLFPWQARLXDRDVASAAPEKAEN PAGHGSKEVKGKTHTYYQVLIDARDCPHISQRSQTEAVTFLANHDDSRALYAIP GLDYVSHEDILPYTSTDQVPIQHELFERFLLYDQTKAPPFVARETLRAWQEKNH PWLELSDVHRETTENIRVTVIPFYMGMREAQNSHVYWWRYCIRLENLDSDVVQ LRERHWRIFSLSGTLETVRGRGVVGREPVLSKEQPAFQYSSHVSLQASSGHMW GTFRFERPDGSHFDVRIPPFSLESNKDEKTPPSGLHW (SEQ ID NO:751); MAACTARRPGRGQPLVVPVADXGPVAKAALCAA (SEQ ID NO:752); VLETVGVFEVPKQNGKYETGQLFLHSIFGYRGVVL (SEQ ID NO:757); GLDYVSHEDILPYTST (SEQ ID NO:758); DVHRETTENIRVTVIPFYM (SEQ ID NO:759); WWRYCIRLENLDSDVVQLRER (SEQ ID NO:760); and/or PAFQYSS HVSLQASSGHMWGTFRFER (SEQ ID NO:761). Polynucleotides encoding these polypeptides are also encompassed by the invention.

This gene is expressed primarily in gall bladder, prostate, and fetal brain, and to a lesser extent in a few tumor and fetal tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, growth related disorders such as cancers. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the prostate, gall bladder, and fetal brain, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of growth-related disorders, such cancers.

FEATURES OF PROTEIN ENCODED BY GENE NO: 184

In specific embodiments, polypeptides of the invention comprise the sequence:SLCCPEGAEGC (SEQ ID NO:762) and/or QLKKTHYDRPCP (SEQ ID NO:763). Polynucleotides encoding these polypeptides are also encompassed by the invention.

This gene is expressed primarily in stromal cell, tonsil, and glioblastoma and to a lesser extent in some other tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immune and inflammatory disorders and glioblastoma. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the stromal cells, tonsil, and glioblastoma expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Additionally, it is believed that the product of this gene regulates pancreatic cell differentiation into beta cells. Accordingly, polynucleotides and polypeptides of the invention are useful in the treatment of insulin-dependent diabetes mellitus and associated conditions e.g. pancreatic hypofunction and the prevention, as well as the treatment of undifferentiated type pancreatic cancers. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 417 as residues: Pro-27 to Ala-32.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of immune and inflammatory disorders and glioblastoma.

FEATURES OF PROTEIN ENCODED BY GENE NO: 185

This gene is expressed primarily in hepatocellular carcinoma and to a lesser extent in other tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, liver diseases. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the liver, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 418 as residues: Gly-32 to Lys-39.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of liver diseases.

FEATURES OF PROTEIN ENCODED BY GENE NO: 186

This gene is expressed primarily in hippocampus and to a lesser extent in other tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neutronal disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the hippocampus, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of neuronal disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 187

This gene is expressed primarily in bone cancer and hippocampus and to a lesser extent in osteoclastoma and other tissues.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, bone-related disorders and neuronal diseases. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the bone, ostoeclast, and hippocampus, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of bone-related disorders and neuronal diseases.

FEATURES OF PROTEIN ENCODED BY GENE NO: 188.

This gene maps to chromosome 4 and therefore polynucleotides of the invention can be used in linkage analysis as a marker for chromosome 4.

This gene is expressed primarily in neuronal tissues such as hippocampus, spinal cord, and hypothalamus and to a lesser extent in a few other tissues such as ovary.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neuronal diseases. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the neuronal tissues, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of neuronal disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 189

This gene maps to chromosome 10, therefore, polynucleotides of the invention can be used in linkage analysis as a marker for chromosome 10.

This gene is expressed primarily in neuronal tissues and immune tissues, and to a lesser extent in a few other tissues such as skin tumor, lung etc.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neuronal and immune-related disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the neuronal and immune-related tissues, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 422 as residues: Pro-19 to Asp-25.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of neuronal and immune-related disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 190

The translation product of this gene shares sequence homology with human N33, a gene located in a homozygously deleted region of human metastatic prostate cancer which is thought to be important in prevention of prostate cancer. In specific embodiments, polypeptides of the invention comprise the sequence: AQRKKEMVLSEKVSQLMEWTNKRPVIRMNGDKFRRLVKAPPRNYSVIVMFTA LQLHRQCVVCKQADEEFQILANSWRYSSAFTNRIFFAMVDFDEGSDVFQMLNM NSAPTFINFPAKGKPKRGDTYELQVRGFSAEQIARWIADRTDVNIRVIRPPNMA ARWRFWCVSVT (SEQ ID NO:765); MVVALLIVCDVPSAS (SEQ ID NO:766); AQRKKEMVLSEKVSQL (SEQ ID NO:767); MEWTNKRPVIRMNGDKF (SEQ ID:768); RRLVKAPPRNYSVIVMFTALQLHRQCVVCKQADEEFQILANSWRY SSAFTNRIFFA (SEQ ID NO:769); MVDFDEGSDVFQMLNMNSAPTFINFPAK GKP (SEQ ID NO:770); KRGDTYELQVRGFSAEQIARWIADRTDVNIRVIRPPN

(SEQ ID NO:771); and/or YAGPLMLGLLLAVIGGLVYLRRVIWNFSLIKLDGLLQLCVLCLL (SEQ ID NO:772). Polynucleotides encoding these polypeptides are also encompassed by the invention.

This gene is expressed primarily in infant adrenal gland prostate cell line and to a lesser extent in a few other tissues like liver, smooth muscle etc.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, prostate cancer and endocrine disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the prostate and adrenal gland, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 423 as residues: Pro-34 to Gly-43, Arg-113 to Pro-120.

The tissue distribution and homology to N33 indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment for prostate cancer and endocrine disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 191

This gene is expressed primarily in T cell and to a lesser extent in fetal lung.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immune disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue

or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 424 as residues: Trp-3 to Phe-9.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of immune disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 192

This gene maps to chromosome 6, therefore, polynucleotides of the invention can be used in linkage analysis as a marker for chromosome 6. Neural activity and neurotrophins induce synaptic remodeling in part by altering gene expression. This gene is believed to be a glycosylphoshatidylinositol-anchored protein encoded by a hippocampal gene and to possess neural activity. This molecule is believed to be expressed in postmitotic-differentiating neurons of the developing nervous system and neuronal structures associated with plasticity in the adult. Message of this gene is believed to be induced by neuronal activity and by the activity-regulated neurotrophins BDNF and NT-3. The product of this gene is believed to stimulate neurite outgrowth and arborization in primary embryonic hippocampal and cortical cultures and to act as a downstream effector of activity-induced neurite outgrowth. In specific embodiments, polypeptides of the invention comprise the sequence: DAVFKGFSDCLLKLGDS (SEQ ID NO:773); CQEGAKDMWDKLRKESKNLN (SEQ ID NO:774); VLLVSLSAALATWLSF (SEQ ID NO:775); MGLKLNGRYISLILAVQIAYLVQAVRAAGKCDAVFKGFSDCLLKLGDS (SEQ ID NO:776); PAAWDDKTNIKTVCTYWEDFHSCTVTALTDCQEGAKDMWDKLRKESKNLNIQGSLFELCGSGNGAAGSLLPAFPVLLVSLSAALATWLSF (SEQ ID NO:777); and/or MGLKLNGRYISLILAVQIAYLVQAVRAAGKCDAVFKGFSDCLLKLGDSXXXXXPAAWDDKTNIKTVCTYWEDFHSCTVTALTDCQEGAKDMWDKLRKESKNLNIQGSLFELCGSGNGAAGSLLPAFPVLLVSLSAALATWLSF (SEQ ID NO:778). Polynucleotides encoding this polypeptide are also encompassed by the invention.

This gene is expressed primarily in human placenta, endometrial tumor and tissues of the central nervous system (CNS).

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, relating to reproductive disorders, cancers and neurological diseases. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the reproductive and neurological disorders, expression of this gene at significantly higher

or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 425 as residues: Asp-47 to Asp-63, His-75 to Tyr-80, Pro-83 to Tyr-89.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of reproductive disorders such as endometrial tumors. Expression of this gene in tissues of the CNS and its strong homology to Neuritin suggest that the protein product from this gene may also be used in the treatment and diagnosis of neurological disorders and in the regeneration of neural tissues, e.g., following injury.

FEATURES OF PROTEIN ENCODED BY GENE NO: 193

The translation product of this gene shares sequence homology with tenascin which is thought to be important in development. The translation product of this gene is believed to be a ligand of the fibroblast growth factor family. FGF ligand activity is known in the art and can be assayed by methods known in the art and disclosed elsewhere herein.

This gene is expressed primarily in endometrial tumors, and other types of tumors.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, cancers. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the cancer tissues, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 426 as residues: Gly-29 to Glu-34, Arg-71 to Arg-76, Thr-176 to Cys-182, Gly-184 to Glu-199.

The tissue distribution and homology to tenascin indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of cancers.

FEATURES OF PROTEIN ENCODED BY GENE NO: 194

In specific embodiments, polypeptides of the invention comprise the sequence: MNSAAGFSHLDRRERVLKLGESFEKQPRCASTLC (SEQ ID NO:779). Polynucleotides encoding these polypeptides are also encompassed by the invention.

This gene is expressed primarily in fetal human lung and neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to: lung development and respiratory disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the respiratory system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution in fetal lung and neutrophils indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of lung and immunity related diseases, for example, lung cancer, viral, fungal or bacterial infections (e.g. lesions caused by tuberculosis), inflammation (e.g. pneumonia), metabolic lesions etc.

FEATURES OF PROTEIN ENCODED BY GENE NO: 195

This gene is expressed primarily in breast lymph node.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immunal disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at

significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis and treatment of immunal disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 196

This gene maps to chromosome 5 and accordingly, polynucleotides of the invention can be used in linkage analysis as a marker for chromosome 5. The translation product of this gene shares sequence homology with human M-phase phosphoprotein 4 which is thought to be important in phosphorylation and signal transduction processes. In specific embodiments, polypeptides of the invention comprise the sequence: TIYPTEEELQAVQKIVSITERALKLVSD (SEQ ID NO:780); RALKGVLRV GVLAKGLLLRGDRNVNLVLLC (SEQ ID NO:781); ALAALRHAKWFQARAN GLQSCVIIIRILRDLCQRVPTWS (SEQ ID NO:782); GDALRRVFECISSGIIL (SEQ ID NO:783); LAFRQIHKVLGMDPLP (SEQ ID NO:784); and/or TIYPTEEELQAVQ KIVSITERALKLVSDSLSEHEKNKNKEGDDKKEGGKDRALKGVLRVGVLAKG LLLRGDRNVNLVLLCSEKPSKTLLSRIAENLPKQLAVISPEKYDIKCAVSEAAIIL NSCVEPKMQVTITLTSPIIREENMREGDVTSGMVKDPPDVLDRQKCLDALAALR HAKWFQARANGLQSCVIIIRILRDLCQRVPTWSDFPSWAMELLVEKAISSASSP QSPGDALRRVFECISSGIILKGSPGLLDPCEKDPFDTLATMTDQQREDITSSAQFA LRLLAFRQIHKVLGMDPLPQMSQRFNIHNNRKRRRDSDGVDGFEAEGKKDKK DYDNF (SEQ ID NO:785). Polynucleotides encoding these polypeptides are also encompassed by the invention.

This gene is expressed primarily in Human Hippocampus and to a lesser extent in Prostate, Human Frontal Cortex.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, disorders related to reproductive system and nervous system. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the reproductive system and nervous system, expression of this gene at significantly higher or lower

levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to human M-phase phosphoprotein 4 indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis and treatment of reproductive and nervous system disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 197

In specific embodiments, polypeptides of the invention comprise the sequence: MGSQHSAAARPSSCRRKQEDDRDG (SEQ ID NO:786); LLAEREQEEAIAQFPYVEFTGRDSITCLTC (SEQ ID NO:787); and/or QGTGYIPTEQVNELVALIPHSDQRLRPQRTKQYV (SEQ ID NO:788). Polynucleotides encoding these polypeptides are also encompassed by the invention.

This gene is expressed primarily in Human Primary Breast Cancer and to a lesser extent in Human Adult Spleen, Hodgkin's Lymphoma I, Salivary Gland.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, cancer and immunal disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the cancer and immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 430 as residues: Ser-126 to Gly-138.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis and treatment of cancer and immunal disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 198

This gene is expressed primarily in monocytes.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, blood cell disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis and treatment of blood cell disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 199

This gene is expressed primarily in Human Ovary and Synovia and to a lesser extent in Human 8 Week Whole Embryo.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, reproductive and developmental disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the reproductive and developmental system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for the diagnosis and treatment of reproductive and developmental disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 200

This gene maps to chromosome 8 and therefore polynucleotides of the invention can be used in linkage analysis as a marker for chromosome 8. The translation product of this gene shares limited sequence homology with collagen proline rich domain.

This gene is expressed primarily in CNS.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, neurological diseases. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the nervous system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 433 as residues: Pro-35 to Asp-41.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of neurological diseases.

FEATURES OF PROTEIN ENCODED BY GENE NO: 201

Translation product of this gene shares homology with a mammalian histone H1a protein. One embodiment for this gene is the polypeptide fragments comprising the following amino acid sequence: ARLNVGRESLKREMLKSQGVKVSESPMGAR HSSWPEGAAFCKKVQGAQMQFPPRR (SEQ ID NO:789); ARLNVGRESLKR EML (SEQ ID NO:790); LKSQGVKVSESPMGARHSSW (SEQ ID NO:791); AFCKKVQGAQMQFPPRR (SEQ ID NO:792). An additional embodiment is the polynucleotide fragments encoding these polypeptide (See Accession No. pir|S24178) fragments.

This gene is expressed primarily in neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are

not limited to, immune disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of immune disorders. Since the gene is expressed in cells of lymphoid origin, the natural gene product may be involved in vital immune functions. Therefore it may be also used as an agent for immunological disorders including arthritis, asthma, immune deficiency diseases such as AIDS, and leukemia.

FEATURES OF PROTEIN ENCODED BY GENE NO: 202

This gene is expressed primarily in neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immune disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of immune disorders. Since the gene is expressed in cells of lymphoid origin, the natural gene product may be involved in immune functions. Therefore it may be also used as an agent for immunological disorders including arthritis, asthma, immune deficiency diseases such as AIDS, and leukemia.

FEATURES OF PROTEIN ENCODED BY GENE NO: 203

This gene is expressed primarily in Neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, infectious disorders, immune disorders, and cancers. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the immune system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 436 as residues: Thr-31 to Lys-36.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of infectious disorders, immune disorders, and cancers. Since the gene is expressed in cells of lymphoid origin, the natural gene product may be involved in immune functions. Therefore it may be also used as an agent for immunological disorders including arthritis, asthma, immune deficiency diseases such as AIDS, and leukemia. Protein, as well as, antibodies directed against the protein may show utility as a tumor marker and/or immunotherapy targets for the above listed tumors and tissues.

FEATURES OF PROTEIN ENCODED BY GENE NO: 204

This gene maps to chromosome 16 and therefore polynucleotides of the invention can be used in linkage analysis as markers for chromosome 16. The translation product of this gene shares sequence homology with lactate dehydrogenase which is thought to be important in lactate metabolism.

This gene is expressed primarily in human tonsils and to a lesser extent in Spleen, and Neutrophils.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, immune disorders, infectious disorders, and cancers. Similarly,

polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells. particularly of the immune disorders, infectious disorders, and cancers. expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 437 as residues: Gly-7 to Ser-12.

The tissue distribution and homology to lactate dehydrogenase gene indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of immune disorders, infectious disorders, and cancers.

FEATURES OF PROTEIN ENCODED BY GENE NO: 205

The translation product of this gene shares sequence homology with Gcap1 protein which is developmentally regulated in brain.

This gene is expressed primarily in placenta and endometrial tumor and to a lesser extent in several other tumors.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, vasculogenesis/angiogenesis and tumorigenesis. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the vascular system and tumors, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution and homology to Gcap1 protein indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and treatment of disorder or dysfunction of vascular system of tumorigenesis.

FEATURES OF PROTEIN ENCODED BY GENE NO: 206

In specific embodiments, polypeptides of the invention comprise the sequence MPYAQWLAENDRFEEAQKAFHKAGRQREA (SEQ ID NO:799); VQVLEQLTNNAVAESRFNDAAYYYWMLSMQCLDLAQD (SEQ ID NO:794); PAQKDTMLGKFYHFQRLAELYHGYHAIHRHTEDP (SEQ ID NO: 795); FSVHRPETLFNISRFLLHSLPKDTPSGISKVKILFT (SEQ ID NO:800); LAKQSKALGAYRLARHAYDKLRGLYIP (SEQ ID NO:796); ARFQKSIELG-TLTIRAKPFHDSEELVPLCYRCSTNN (SEQ ID NO: 797); and/or PLLNNLGNVC INCRQPFIFSASSYDVLHLVEFYLEEGITDEEAISLIDLEVLRPKRDDRQLEICKQQ LPDSCG (SEQ ID NO:798). Polynucleotides encoding these polypeptides are also encompassed by the invention.

This gene is expressed primarily in testes.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, male reproductive and endocrine disorders. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders of the above tissues or cells, particularly of the reproductive and endocrine systems, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for treatment of male reproductive and endocrine disorders.

FEATURES OF PROTEIN ENCODED BY GENE NO: 207

This gene is expressed in fetal lung.

Therefore, polynucleotides and polypeptides of the invention are useful as reagents for differential identification of the tissue(s) or cell type(s) present in a biological sample and for diagnosis of diseases and conditions, which include, but are not limited to, lung diseases such as cystic fibrosis. Similarly, polypeptides and antibodies directed to these polypeptides are useful in providing immunological probes for differential identification of the tissue(s) or cell type(s). For a number of disorders

of the above tissues or cells, particularly of the respiratory system, expression of this gene at significantly higher or lower levels may be routinely detected in certain tissues (e.g., cancerous and wounded tissues) or bodily fluids (e.g., serum, plasma, urine, synovial fluid or spinal fluid) or another tissue or cell sample taken from an individual having such a disorder, relative to the standard gene expression level, i.e., the expression level in healthy tissue or bodily fluid from an individual not having the disorder. Preferred epitopes include those comprising a sequence shown in SEQ ID NO: 440 as residues: Tyr-49 to Cys-54.

The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for detection and treatment of disorders associated with developing lungs particularly in premature infants where the lungs are the last tissues to develop. The tissue distribution indicates that polynucleotides and polypeptides corresponding to this gene are useful for diagnosis and intervention of lung tumors since the gene may be involved in the regulation of cell division, particularly since it is expressed in fetal tissue. Protein, as well as, antibodies directed against the protein may show utility as a tumor marker and immunotherapy targets for the above listed tumors and tissues.

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
1	HLHDS67	97979 03/27/97	Uni-ZAP XR	11	2526	427	2526	458	458	234	1	30	31	30
2	HLHDZ58	97979 03/27/97	Uni-ZAP XR	12	1131	1	1131	129	129	235	1	14	15	115
3	HLMMJ13	97979 03/27/97	Lambda ZAP II	13	941	39	941	62	62	236	1	44	45	102
3	HLMMJ13	97979 03/27/97	Lambda ZAP II	218	941	39	941	245	245	441	1	35	36	41
4	HLTEI25	97979 03/27/97	Uni-ZAP XR	14	843	1	843	155	155	237	1	19	20	42
5	HMSJX24	97979 03/27/97	Uni-ZAP XR	15	1018	1	1018	90	90	238	1	18	19	36
6	HNFED65	97979 03/27/97	Uni-ZAP XR	16	661	1	661	76	76	239	1	28	29	127
7	HNHDX07	97979 03/27/97	Uni-ZAP XR	17	553	1	553	106	106	240	1	23	24	66
8	HNHGC82	97979 03/27/97	Uni-ZAP XR	18	869	1	869	101	101	241	1	21	22	68
9	HNHGO09	97979 03/27/97	Uni-ZAP XR	19	959	1	959	176	176	242	1	21	22	44
10	HOUBE18	97979 03/27/97	Uni-ZAP XR	20	1446	1	1446	101	101	243	1	27	28	50
11	HOUDL69	97979 03/27/97	Uni-ZAP XR	21	1471	579	1460	692	692	244	1	31	32	42

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
12	HPMFI71	97979 03/27/97	Uni-ZAP XR	22	1402	242	1402	401	401	245	1	32	33	60
13	HPMGQ55	97979 03/27/97	Uni-ZAP XR	23	1047	1	1047	164	164	246	1	26	27	35
14	HPQAC69	97979 03/27/97	Lambda ZAP II	24	990	1	988	82	82	247	1	20	21	37
15	HPTBB03	97979 03/27/97	Uni-ZAP XR	25	1208	350	1173	398	398	248	1	29	30	210
16	HPTWA66	97979 03/27/97	pBluescript	26	1922	1381	1922	24	24	249	1	33	34	547
16	HPTWA66	97979 03/27/97	pBluescript	219	575	1	575	148	148	442	1	22	23	65
17	HPTWC08	97979 03/27/97	pBluescript	27	1951	1422	1874	219	219	250	1	19	20	299
18	HRGCZ46	97979 03/27/97	Uni-ZAP XR	28	3989	2635	3989		2748	251	1	16	17	39
19	HSAVU34	97979 03/27/97	Uni-ZAP XR	29	3735	2966	3735	272	272	252	1	30	31	594
19	HSAVU34	97979 03/27/97	Uni-ZAP XR	220	3018	1929	3018	26	26	443	1	1	2	156
20	HSDFW61	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	30	1667	59	1625	138	138	253	1	32	33	130
21	HSDGP60	97974 04/04/97	Uni-ZAP XR	31	1408	1	1408	285	285	254	1			20

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		209080 05/29/97												
22	HSOAJ55	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	32	2031	1273	2031	1285	1285	255	1	29	30	30
23	HSQEO84	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	33	971	13	971	91	91	256	1	19	20	218
23	HSQEO84	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	221	968	8	968	86	86	444	1	20	21	56
24	HSXAM05	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	34	1792	369	1792	470	470	257	1	26	27	49
25	HSXAS67	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	35	896	1	896	96	96	258	1	32	33	121
26	HTDAF28	97974 04/04/97 209080 05/29/97	pSport1	36	912	1	912	38	38	259	1	22	23	87
27	HTEGQ64	97974	Uni-ZAP XR	37	1382	67	1382	271	271	260	1			25

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		04/04/97 209080 05/29/97												
28	HTGEU09	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	38	872	1	872	74	74	261	1	18	19	28
29	HTOAM21	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	39	812	1	812	41	41	262	1	30	31	43
30	HTPBW79	209511 12/03/97	Uni-ZAP XR	40	1515	118	1507	302	302	263	1	24	25	362
30	HTSEV09	97974 04/04/97 209080 05/29/97	pBluescript	222	1404	1	1265	92	92	445	1	19	20	415
31	HJPCD40	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	41	704	22	704		117	264	1	18	19	127
32	HTWBY48	97974 04/04/97 209080 05/29/97	pSport1	42	1094	1	1094	32	32	265	1	34	35	53
33	HTWCI46	97974 04/04/97	pSport1	43	1821	892	1647	56	56	266	1	26	27	28

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		209080 05/29/97												
34	HTXGI75	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	44	1024	30	1024		167	267	1	20	21	25
35	HWTBF59	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	45	983	779	983	85	85	268	1	30	31	221
35	HWTBF59	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	223	707	488	707	514	514	446	1	41	42	64
36	HADAE74	97974 04/04/97 209080 05/29/97	pSport1	46	2421	664	1587	710	710	269	1			2
37	HAGFB60	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	47	840	1	840	97	97	270	1	30	31	48
38	HATEF60	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	48	2432	1193	2246	1491	1491	271	1	17	18	51
39	HBMSN25	97974	Uni-ZAP XR	49	1742	1165	1742	1207	1207	272	1	23	24	31

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		04/04/97 209080 05/29/97												
40	HCDAR68	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	50	1487	181	1455	325	325	273	1	35	36	56
41	HCE3J79	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	51	1328	251	1328	525	525	274	1			21
42	HMDAN54	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	52	1856	725	1853	928	928	275	1	33	34	50
43	HCECA49	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	53	1558	310	1408	393	393	276	1			1
44	HCEEC15	97974 04/04/97 209080 05/29/97	Uni-ZAP XR	54	948	1	948	9	9	277	1	23	24	65
45	HCESF40	97974 04/04/97 209080 05/29/97	pBluescript	55	990	99	990	193	193	278	1	32	33	256

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
45	HCESF40	97974 04/04/97 209080 05/29/97	pBluescript	224	1384	99	1384	193	193	447	1	32	33	205
46	HCFMV39	97974 04/04/97 209080 05/29/97	pSport1	56	1603	1	1296	96	96	279	1	29	30	102
47	HCMSX86	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	57	1052	5	786	12	12	280	1	28	29	32
48	HCNAP62	97975 04/04/97 209081 05/29/97	Lambda ZAP II	58	814	1	558	93	93	281	1	22	23	42
49	HCRAF32	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	59	1215	257	1215		356	282	1	19	20	20
50	HCUDC07	97975 04/04/97 209081 05/29/97	ZAP Express	60	478	1	478	147	147	283	1	36	37	69
51	HCWBB42	97975 04/04/97 209081	ZAP Express	61	618	1	618	212	212	284	1	35	36	74

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		05/29/97												
52	HDTAB05	97975 04/04/97 209081 05/29/97	pCMVSport 2.0	62	751	1	751	257	257	285	1	21	22	32
53	HE2AV74	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	63	780	283	780		433	286	1			16
54	HE2AY71	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	64	588	21	588	169	169	287	1			16
55	HE2GS36	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	65	774	272	774	445	445	288	1			37
56	HE2OF09	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	66	1866	1313	1866	1596	1596	289	1			11
57	HE6EU50	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	67	1152	117	686	237	237	290	1	20	21	34
58	HE9HU17	97975 04/04/97	Uni-ZAP XR	68	2483	1577	2448	1620	1620	291	1			14

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		209081 05/29/97												
59	HE9ND48	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	69	536	1	536	83	83	292	1	36	37	43
60	HEBBW11	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	70	865	647	865		388	293	1	30	31	135
61	HELDY74	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	71	932	1	932	201	201	294	1	17	18	33
62	HEMAE80	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	72	996	1	945	12	12	295	1	24	25	136
63	HFEBA88	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	73	785	464	785	356	356	296	1	29	30	57
64	HFGAB89	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	74	1069	196	1047	295	295	297	1	32	33	34
65	HFVHY45	97975	pBluescript	75	831	1	831		89	298	1	30	31	76

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		04/04/97 209081 05/29/97												
66	HGBAJ93	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	76	590	1	590	233	233	299	1	38	39	94
67	HGBBQ69	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	77	1274	1	1273	105	105	300	1	24	25	43
68	HHFCF08	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	78	1133	4	1042	175	175	301	1	23	24	30
69	HHFHJ59	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	79	661	1	661	192	192	302	1	29	30	112
70	HHFHR32	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	80	1378	1	1378		358	303	1			13
71	HHGCN69	97975 04/04/97 209081 05/29/97	Lambda ZAP II	81	1440	298	1440	532	532	304	1	23	24	34

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
72	HHGDO13	97975 04/04/97 209081 05/29/97	Lambda ZAP II	82	1381	766	1371	993	993	305	1	23	24	34
73	HHPFD63	97975 04/04/97 209081 05/29/97	Uni-ZAP XR	83	1706	182	1644	257	257	306	1	24	25	81
74	HHSEG23	97976 04/04/97	Uni-ZAP XR	84	573	1	573	160	160	307	1	18	19	71
75	HJPAV06	97976 04/04/97	Uni-ZAP XR	85	684	199	684	323	323	308	1	27	28	33
76	HKIXL73	97976 04/04/97	pBluescript	86	1036	591	1036	690	690	309	1	32	33	114
77	HKMNC43	97976 04/04/97	pBluescript	87	908	1	908	139	139	310	1	18	19	108
78	HMEJE31	97976 04/04/97	Lambda ZAP II	88	655	1	655	165	165	311	1	33	34	64
79	HMSKS35	97976 04/04/97	Uni-ZAP XR	89	1102	1	1102	228	228	312	1	26	27	49
80	HNFAE54	97976 04/04/97	Uni-ZAP XR	90	1533	665	1518	347	347	313	1	26	27	293
81	HNFJH45	97976 04/04/97	Uni-ZAP XR	91	575	1	575	275	275	314	1	30	31	67
82	HNGBT31	97976 04/04/97	Uni-ZAP XR	92	639	1	639	224	224	315	1	28	29	104

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
83	HNGIN60	97976 04/04/97	Uni-ZAP XR	93	744	1	744	225	225	316	1	43	44	70
84	HNGJG84	97976 04/04/97	Uni-ZAP XR	94	526	1	526	268	268	317	1	29	30	38
85	HNHDW42	97976 04/04/97	Uni-ZAP XR	95	426	1	426	168	168	318	1	28	29	71
86	HNHFL57	97976 04/04/97	Uni-ZAP XR	96	844	1	844	98	98	319	1	25	26	61
87	HOGAR52	97977 04/04/97 209082 05/29/97	pCMVSport 2.0	97	1985	453	1985	533	533	320	1	17	18	285
88	HOSBZ55	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	98	1416	69	1416	246	246	321	1	32	33	54
89	HOSDI92	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	99	1935	141	772		274	322	1	20	21	58
90	HPBCU51	97977 04/04/97 209082 05/29/97	pBluescript SK-	100	599	1	599	86	86	323	1	27	28	119
91	HPCAL49	97977 04/04/97 209082	Uni-ZAP XR	101	784	1	784		280	324	1	18	19	43

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		05/29/97												
92	HPFCR13	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	102	1035	602	1035	859	859	325	1	32	33	58
93	HPHAC83	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	103	2218	840	2182	1035	1035	326	1	17	18	17
94	HPMBQ32	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	104	1351	1	1351	18	18	327	1	23	24	86
95	HPWAN23	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	105	2066	51	2052	270	270	328	1	29	30	537
95	HPWAN23	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	226	2057	1	1954	220	220	449	1	29	30	315
96	HRDFB85	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	106	1705	23	1697	233	233	329	1	21	22	201
97	HRGBR28	97977 04/04/97	Uni-ZAP XR	107	1167	611	1167	53	53	330	1	1	2	263

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		209082 05/29/97												
98	HSKGN81	97977 04/04/97 209082 05/29/97	pBluescript	108	1907	151	1432	353	353	331	1	23	24	260
98	HSKGN81	97977 04/04/97 209082 05/29/97	pBluescript	227	2084	335	2084	537	537	450	1	19	20	23
99	HSPAH56	97977 04/04/97 209082 05/29/97	pSport1	109	611	1	576	229	229	332	1	25	26	47
100	HE8EU04	209746 04/07/98	Uni-ZAP XR	110	2632	294	2632	337	337	333	1	25	26	333
100	HSXBT86	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	228	2143	53	1096	235	235	451	1			9
101	HSXCS62	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	111	2249	1	1953	90	90	334	1	18	19	199
102	HTEFU09	97977 04/04/97 209082	Uni-ZAP XR	112	2198	228	2158	400	400	335	1			23

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		05/29/97												
103	HTEKM35	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	113	1043	40	1043	320	320	336	1	20	21	142
104	HTGEP89	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	114	703	1	703	285	285	337	1	29	30	94
105	HTGEW91	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	115	3684	526	1338	584	584	338	1	24	25	37
106	HTOEY16	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	116	1965	127	1915	202	202	339	1	27	28	38
107	HTPCN79	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	117	503	1	503		1	340	1	7	8	70
108	HTSGM54	97977 04/04/97 209082 05/29/97	pBluescript	118	1133	316	1069		423	341	1	12	13	84
109	HTSHE40	97977 04/04/97	pBluescript	119	1101	118	956	218	218	342	1	31	32	89

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		209082 05/29/97												
110	HTWAF58	97977 04/04/97 209082 05/29/97	Lambda ZAP II	120	282	1	282	137	137	343	1	25	26	48
111	HTWBY29	97977 04/04/97 209082 05/29/97	pSport1	121	2635	1593	2489	1654	1654	344	1	25	26	55
112	HUKFC71	209007 04/28/97 209083 05/29/97	Lambda ZAP II	122	994	1	932		272	345	1	15	16	221
113	HCE3Q10	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	123	1542	1	1542	143	143	346	1	25	26	63
114	HCEVR60	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	124	1390	82	1390	127	127	347	1	32	33	153
115	HDTAW95	209007 04/28/97 209083 05/29/97	pCMVSport 2.0	125	1288	412	1288	571	571	348	1			16
116	HE6EL90	209007	Uni-ZAP XR	126	1517	1	1452	243	243	349	1			9

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		04/28/97 209083 05/29/97												
117	HELBU29	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	127	1073	198	1073		776	350	1			13
118	HERAH36	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	128	300	155	300	202	202	351	1			17
119	HFXBW82	209007 04/28/97 209083 05/29/97	Lambda ZAP II	129	1275	1	1275	56	56	352	1	23	24	61
120	HHPTD20	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	130	472	51	472		243	353	1			32
121	HIBED17	209007 04/28/97 209083 05/29/97	Other	131	1950	284	1927	395	395	354	1	72	73	245
122	HLTER03	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	132	990	1	990	78	78	355	1	22	23	34

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
123	HOABL56	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	133	1720	565	1720	660	660	356	1	18	19	21
124	HPMCJ92	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	134	705	28	705	106	106	357	1	28	29	98
125	HPWAZ95	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	135	323	1	323	88	88	358	1	27	28	78
126	HRGBR18	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	136	582	1	582		16	359	1	17	18	30
127	HSUBW09	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	137	1021	1	1021	153	153	360	1	32	33	56
128	HUKCO64	209007 04/28/97 209083 05/29/97	Lambda ZAP II	138	1777	439	1777		521	361	1			2
129	H6EAA53	209007 04/28/97 209083	Uni-ZAP XR	139	643	303	643		313	362	1	7	8	31

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		05/29/97												
130	HAGAI11	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	140	1220	1	1220		127	363	1	16	17	27
131	HAGAO39	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	141	721	1	721		415	364	1			14
132	HALSK07	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	142	1468	125	1468	210	210	365	1	29	30	33
133	HALSQ59	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	143	300	4	300	101	101	366	1	22	23	66
134	HAIBP89	unknown 05/18/98	Uni-ZAP XR	144	2243	173	2243	311	311	367	1	27	28	317
134	HBGCB91	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	229	1025	409	1025	624	624	452	1	20	21	25
135	HBMTD81	209008 04/28/97 209084 05/29/97	Uni-ZAP XR	145	1082	163	1082	357	357	368	1			30

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
136	HBXGK12	209008 04/28/97 209084 05/29/97	ZAP Express	146	4313	1153	4313	1313	1313	369	1	18	19	42
137	HFKFJ07	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	147	1183	1	1183	149	149	370	1	41	42	254
138	HCQAI40	209008 04/28/97 209084 05/29/97	Lambda ZAP II	148	734	1	734	285	285	371	1			19
139	HCWHZ24	209008 04/28/97 209084 05/29/97	ZAP Express	149	1405	1	1405	108	108	372	1	34	35	63
140	HE2GT20	209008 04/28/97 209084 05/29/97	Uni-ZAP XR	150	2890	1178	2890	1178	1178	373	1	31	32	39
141	HE8EY43	209008 04/28/97 209084 05/29/97	Uni-ZAP XR	151	2399	1181	2399	1265	1265	374	1	30	31	34
142	HFCEB37	209008 04/28/97 209084	Uni-ZAP XR	152	802	352	802		487	375	1			10

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		05/29/97												
143	HFTCT67	209008 04/28/97 209084 05/29/97	Uni-ZAP XR	153	461	24	461	145	145	376	1	37	38	63
144	HGLAM46	209008 04/28/97 209084 05/29/97	Uni-ZAP XR	154	2388	818	2388	648	648	377	1			18
145	HHGBR15	209008 04/28/97 209084 05/29/97	Lambda ZAP II	155	642	322	642	400	400	378	1			4
146	HJAAU36	209008 04/28/97 209084 05/29/97	pBluescript SK-	156	1251	583	1251		933	379	1	16	17	16
147	HUSIT49	209008 04/28/97 209084 05/29/97	pSport1	157	2127	247	2127	383	383	380	1	47	48	83
148	HKLAB16	209008 04/28/97 209084 05/29/97	Lambda ZAP II	158	1625	817	1625	1012	1012	381	1	18	19	20
149	HLMMU76	209008 04/28/97	Lambda ZAP II	159	1687	1307	1687	1296	1296	382	1	28	29	28

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		209084 05/29/97												
150	HMSKQ35	209008 04/28/97 209084 05/29/97	Uni-ZAP XR	160	1842	172	1463	319	319	383	1	30	31	33
151	HNHED86	209008 04/28/97 209084 05/29/97	Uni-ZAP XR	161	770	1	770	30	30	384	1	31	32	46
152	HNHEJ88	209008 04/28/97 209084 05/29/97	Uni-ZAP XR	162	519	1	519	242	242	385	1	17	18	24
153	HNHFQ63	209008 04/28/97 209084 05/29/97	Uni-ZAP XR	163	753	1	753	164	164	386	1	17	18	67
154	HOECU83	209009 04/28/97	Uni-ZAP XR	164	1400	189	1400		508	387	1	22	23	33
155	HPTRC15	209009 04/28/97	pBluescript	165	2153	594	2153		611	388	1			13
156	HSKCP69	209009 04/28/97	Uni-ZAP XR	166	1251	219	1120			389	1			
156	HSKCP69	209009 04/28/97	Uni-ZAP XR	230	1250	223	1250	393	393	453	1	32	33	171
157	H6EAE26	209009	Uni-ZAP XR	167	882	48	882	155	155	390	1	33	34	153

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		04/28/97												
158	HAGBX03	209009 04/28/97	Uni-ZAP XR	168	1208	1	1208	182	182	391	1			8
159	HAGDQ47	209009 04/28/97	Uni-ZAP XR	169	1307	1	1307	44	44	392	1	22	23	60
160	HAICP19	209009 04/28/97	Uni-ZAP XR	170	1624	89	1483	128	128	393	1	18	19	446
161	HAUAE83	209009 04/28/97	Uni-ZAP XR	171	2003	889	2003	1080	1080	394	1			23
162	HBHAD12	209009 04/28/97	Uni-ZAP XR	172	786	1	786		176	395	1	17	18	23
163	HBMTY28	209009 04/28/97	Uni-ZAP XR	173	1758	962	1758	1184	1184	396	1	27	28	34
164	HBMVP04	209009 04/28/97	Uni-ZAP XR	174	888	330	862		546	397	1			2
165	HCDDB78	209009 04/28/97	Uni-ZAP XR	175	2379	750	2379	901	901	398	1	18	19	24
166	HCEQA68	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	176	1348	1	1348	12	12	399	1	28	29	78
167	HCEZS40	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	177	1502	178	1502	315	315	400	1			20
168	HCFNF11	209010	pSport1	178	1637	26	1607	152	152	401	1	44	45	257

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		04/28/97 209085 05/29/97												
169	HCRBL20	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	179	2911	1103	2858	192	192	402	1	32	33	424
169	HCRBL20	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	231	1811	20	1811	93	93	454	1	36	37	95
170	HCUBL62	209010 04/28/97 209085 05/29/97	ZAP Express	180	519	1	519	57	57	403	1	28	29	32
171	HDSAP81	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	181	968	320	968	476	476	404	1	27	28	79
172	HE2CT29	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	182	1128	1	1128	111	111	405	1	26	27	94
173	HE8MG65	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	183	2276	48	2276	88	88	406	1	37	38	257

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
173	HE8MG65	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	232	2271	56	2232	79	79	455	1	43	44	170
174	HE9FB42	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	184	2500	76	1693	518	518	407	1	1	2	623
175	HEMAM41	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	185	1337	60	1328	175	175	408	1	39	40	190
175	HEMAM41	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	233	1338	33	1327	175	175	456	1	32	33	91
176	HEMCV19	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	186	941	33	931	79	79	409	1	23	24	178
177	HEMDX17	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	187	654	1	654	137	137	410	1			13
178	HETAR54	209010 04/28/97 209085	Uni-ZAP XR	188	1848	454	1848	948	948	411	1	14	15	232

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
		05/29/97												
179	HETBX14	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	189	1146	157	1146		74	412	1	14	15	53
180	HFGAB48	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	190	906	156	906	245	245	413	1	30	31	32
181	HFKFI40	209010 04/28/97 209085 05/29/97	Uni-ZAP XR	191	1941	120	1002	213	213	414	1	18	19	218
182	HFXHN68	209010 04/28/97 209085 05/29/97	Lambda ZAP II	192	2118	777	2118	966	966	415	1	23	24	50
183	HGBFO79	209011 04/28/97	Uni-ZAP XR	193	1538	259	1538	273	273	416	1	23	24	49
184	HGLAM56	209011 04/28/97	Uni-ZAP XR	194	1098	68	1098		185	417	1	28	29	69
185	HHLBA89	209011 04/28/97	pBluescript SK-	195	1001	1	1001	324	324	418	1	25	26	39
186	HHPDW05	209011 04/28/97	Uni-ZAP XR	196	1443	1	1443	246	246	419	1	21	22	21
187	HHPSD37	209011 04/28/97	pBluescript	197	1282	66	1282	171	171	420	1	19	20	37

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
188	HHPSF70	209011 04/28/97	pBluescript	198	951	26	951		162	421	1	16	17	34
189	HHSAK25	209011 04/28/97	Uni-ZAP XR	199	1740	1390	1740	1534	1534	422	1	19	20	31
190	HIASB53	209011 04/28/97	pBluescript	200	1707	401	1195	652	652	423	1	26	27	126
191	HJABZ65	209011 04/28/97	pBluescript SK-	201	779	1	779	23	23	424	1	26	27	68
192	HJPBB39	209011 04/28/97	Uni-ZAP XR	202	1617	188	1605	182	182	425	1	28	29	91
193	HLHSK94	209011 04/28/97	pBluescript	203	1974	1	1794	112	112	426	1	26	27	379
194	HLHTC70	209011 04/28/97	pBluescript	204	1057	229	1057	365	365	427	1	23	24	22
195	HLMIW92	209011 04/28/97	Lambda ZAP II	205	721	1	721	244	244	428	1	25	26	46
196	HLTCY93	209011 04/28/97	Uni-ZAP XR	206	2465	988	2465	1225	1225	429	1			4
197	HLTDB65	209011 04/28/97	Uni-ZAP XR	207	1480	1	1480		371	430	1	15	16	143
198	HMSHM43	209011 04/28/97	Uni-ZAP XR	208	872	1	872	35	35	431	1	18	19	36
199	HMSHQ24	209011 04/28/97	Uni-ZAP XR	209	1779	16	1779	148	148	432	1	24	25	36
200	HNFAH08	209011 04/28/97	Uni-ZAP XR	210	2110	592	2110	611	611	433	1	18	19	191

Gene No.	cDNA Clone ID	ATCC Deposit Nr and Date	Vector	NT SEQ ID NO: X	Total NT Seq.	5' NT of Clone Seq.	3' NT of Clone Seq.	5' NT of Start Codon	5' NT of First AA of Signal Pep	AA SEQ ID NO: Y	First AA of Sig Pep	Last AA of Sig Pep	First AA of Secreted Portion	Last AA of ORF
201	HNGAO10	209011 04/28/97	Uni-ZAP XR	211	938	1	938	107	107	434	1	27	28	30
202	HNGBE45	209011 04/28/97	Uni-ZAP XR	212	1551	1	1551	114	114	435	1	21	22	100
203	HNHAZ16	209011 04/28/97	Uni-ZAP XR	213	997	1	997	202	202	436	1	24	25	36
204	HNHCM59	209011 04/28/97	Uni-ZAP XR	214	1496	1	1132		165	437	1	28	29	41
205	HOSFM22	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	215	1308	501	1308		809	438	1			1
206	HPHAC88	97977 04/04/97 209082 05/29/97	Uni-ZAP XR	216	1705	384	1705	549	549	439	1	23	24	24
207	HCDEO95	209007 04/28/97 209083 05/29/97	Uni-ZAP XR	217	999	608	999	273	273	440	1	22	23	54

Table 1 summarizes the information corresponding to each "Gene No." described above. The nucleotide sequence identified as "NT SEQ ID NO:X" was assembled from partially homologous ("overlapping") sequences obtained from the "cDNA clone ID" identified in Table 1 and, in some cases, from additional related DNA clones. The overlapping sequences were assembled into a single contiguous sequence of high redundancy (usually three to five overlapping sequences at each nucleotide position), resulting in a final sequence identified as SEQ ID NO:X.

The cDNA Clone ID was deposited on the date and given the corresponding deposit number listed in "ATCC Deposit No:Z and Date." Some of the deposits contain multiple different clones corresponding to the same gene. "Vector" refers to the type of vector contained in the cDNA Clone ID.

"Total NT Seq." refers to the total number of nucleotides in the contig identified by "Gene No." The deposited clone may contain all or most of these sequences, reflected by the nucleotide position indicated as "5' NT of Clone Seq." and the "3' NT of Clone Seq." of SEQ ID NO:X. The nucleotide position of SEQ ID NO:X of the putative start codon (methionine) is identified as "5' NT of Start Codon." Similarly, the nucleotide position of SEQ ID NO:X of the predicted signal sequence is identified as "5' NT of First AA of Signal Pep."

The translated amino acid sequence, beginning with the methionine, is identified as "AA SEQ ID NO:Y," although other reading frames can also be easily translated using known molecular biology techniques. The polypeptides produced by these alternative open reading frames are specifically contemplated by the present invention.

The first and last amino acid position of SEQ ID NO:Y of the predicted signal peptide is identified as "First AA of Sig Pep" and "Last AA of Sig Pep." The predicted first amino acid position of SEQ ID NO:Y of the secreted portion is identified as "Predicted First AA of Secreted Portion." Finally, the amino acid position of SEQ ID NO:Y of the last amino acid in the open reading frame is identified as "Last AA of ORF."

SEQ ID NO:X and the translated SEQ ID NO:Y are sufficiently accurate and otherwise suitable for a variety of uses well known in the art and described further below. For instance, SEQ ID NO:X is useful for designing nucleic acid hybridization probes that will detect nucleic acid sequences contained in SEQ ID NO:X or the cDNA contained in the deposited clone. These probes will also hybridize to nucleic acid molecules in biological samples, thereby enabling a variety of forensic and diagnostic methods of the invention. Similarly, polypeptides identified from SEQ ID NO:Y may be used to generate antibodies which bind specifically to the secreted proteins encoded by the cDNA clones identified in Table 1.

Nevertheless, DNA sequences generated by sequencing reactions can contain sequencing errors. The errors exist as misidentified nucleotides, or as insertions or deletions of nucleotides in the generated DNA sequence. The erroneously inserted or deleted nucleotides cause frame shifts in the reading frames of the predicted amino acid sequence. In these cases, the predicted amino acid sequence diverges from the actual amino acid sequence, even though the generated DNA sequence may be greater than 99.9% identical to the actual DNA sequence (for example, one base insertion or deletion in an open reading frame of over 1000 bases).

Accordingly, for those applications requiring precision in the nucleotide sequence or the amino acid sequence, the present invention provides not only the generated nucleotide sequence identified as SEQ ID NO:X and the predicted translated amino acid sequence identified as SEQ ID NO:Y, but also a sample of plasmid DNA containing a human cDNA of the invention deposited with the ATCC, as set forth in Table 1. The nucleotide sequence of each deposited clone can readily be determined by sequencing the deposited clone in accordance with known methods. The predicted amino acid sequence can then be verified from such deposits. Moreover, the amino acid sequence of the protein encoded by a particular clone can also be directly determined by peptide sequencing or by expressing the protein in a suitable host cell containing the deposited human cDNA, collecting the protein, and determining its sequence.

The present invention also relates to the genes corresponding to SEQ ID NO:X, SEQ ID NO:Y, or the deposited clone. The corresponding gene can be isolated in accordance with known methods using the sequence information disclosed herein. Such methods include preparing probes or primers from the disclosed sequence and identifying or amplifying the corresponding gene from appropriate sources of genomic material.

Also provided in the present invention are species homologs. Species homologs may be isolated and identified by making suitable probes or primers from the sequences provided herein and screening a suitable nucleic acid source for the desired homologue.

The polypeptides of the invention can be prepared in any suitable manner. Such polypeptides include isolated naturally occurring polypeptides, recombinantly produced polypeptides, synthetically produced polypeptides, or polypeptides produced by a combination of these methods. Means for preparing such polypeptides are well understood in the art.

The polypeptides may be in the form of the secreted protein, including the mature form, or may be a part of a larger protein, such as a fusion protein (see below).

It is often advantageous to include an additional amino acid sequence which contains secretory or leader sequences, pro-sequences, sequences which aid in purification , such as multiple histidine residues, or an additional sequence for stability during recombinant production.

The polypeptides of the present invention are preferably provided in an isolated form, and preferably are substantially purified. A recombinantly produced version of a polypeptide, including the secreted polypeptide, can be substantially purified by the one-step method described in Smith and Johnson, Gene 67:31-40 (1988). Polypeptides of the invention also can be purified from natural or recombinant sources using antibodies of the invention raised against the secreted protein in methods which are well known in the art.

Signal Sequences

Methods for predicting whether a protein has a signal sequence, as well as the cleavage point for that sequence, are available. For instance, the method of McGeoch, Virus Res. 3:271-286 (1985), uses the information from a short N-terminal charged region and a subsequent uncharged region of the complete (uncleaved) protein. The method of von Heinje, Nucleic Acids Res. 14:4683-4690 (1986) uses the information from the residues surrounding the cleavage site, typically residues -13 to +2, where +1 indicates the amino terminus of the secreted protein. The accuracy of predicting the cleavage points of known mammalian secretory proteins for each of these methods is in the range of 75-80%. (von Heinje, supra.) However, the two methods do not always produce the same predicted cleavage point(s) for a given protein.

In the present case, the deduced amino acid sequence of the secreted polypeptide was analyzed by a computer program called SignalP (Henrik Nielsen et al., Protein Engineering 10:1-6 (1997)), which predicts the cellular location of a protein based on the amino acid sequence. As part of this computational prediction of localization, the methods of McGeoch and von Heinje are incorporated. The analysis of the amino acid sequences of the secreted proteins described herein by this program provided the results shown in Table 1.

As one of ordinary skill would appreciate, however, cleavage sites sometimes vary from organism to organism and cannot be predicted with absolute certainty. Accordingly, the present invention provides secreted polypeptides having a sequence shown in SEQ ID NO:Y which have an N-terminus beginning within 5 residues (i.e., + or - 5 residues) of the predicted cleavage point. Similarly, it is also recognized that in some cases, cleavage of the signal sequence from a secreted protein is not entirely

uniform, resulting in more than one secreted species. These polypeptides, and the polynucleotides encoding such polypeptides, are contemplated by the present invention.

Moreover, the signal sequence identified by the above analysis may not necessarily predict the naturally occurring signal sequence. For example, the naturally occurring signal sequence may be further upstream from the predicted signal sequence. However, it is likely that the predicted signal sequence will be capable of directing the secreted protein to the ER. These polypeptides, and the polynucleotides encoding such polypeptides, are contemplated by the present invention.

Polynucleotide and Polypeptide Variants

"Variant" refers to a polynucleotide or polypeptide differing from the polynucleotide or polypeptide of the present invention, but retaining essential properties thereof. Generally, variants are overall closely similar, and, in many regions, identical to the polynucleotide or polypeptide of the present invention.

By a polynucleotide having a nucleotide sequence at least, for example, 95% "identical" to a reference nucleotide sequence of the present invention, it is intended that the nucleotide sequence of the polynucleotide is identical to the reference sequence except that the polynucleotide sequence may include up to five point mutations per each 100 nucleotides of the reference nucleotide sequence encoding the polypeptide. In other words, to obtain a polynucleotide having a nucleotide sequence at least 95% identical to a reference nucleotide sequence, up to 5% of the nucleotides in the reference sequence may be deleted or substituted with another nucleotide, or a number of nucleotides up to 5% of the total nucleotides in the reference sequence may be inserted into the reference sequence. The query sequence may be an entire sequence shown inTable 1, the ORF (open reading frame), or any fragement specified as described herein.

As a practical matter, whether any particular nucleic acid molecule or polypeptide is at least 90%, 95%, 96%, 97%, 98% or 99% identical to a nucleotide sequence of the presence invention can be determined conventionally using known computer programs. A preferred method for determing the best overall match between a query sequence (a sequence of the present invention) and a subject sequence, also referred to as a global sequence alignment, can be determined using the FASTDB computer program based on the algorithm of Brutlag et al. (Comp. App. Biosci. (1990) 6:237-245). In a sequence alignment the query and subject sequences are both DNA sequences. An RNA sequence can be compared by converting U's to T's. The result of said global sequence alignment is in percent identity. Preferred parameters used in a FASTDB alignment of DNA sequences to calculate percent identiy are: Matrix=Unitary, k-tuple=4, Mismatch Penalty=1, Joining Penalty=30, Randomization

Group Length=0, Cutoff Score=1, Gap Penalty=5, Gap Size Penalty 0.05, Window Size=500 or the lenght of the subject nucleotide sequence, whichever is shorter.

If the subject sequence is shorter than the query sequence because of 5' or 3' deletions, not because of internal deletions, a manual correction must be made to the results. This is becuase the FASTDB program does not account for 5' and 3' truncations of the subject sequence when calculating percent identity. For subject sequences truncated at the 5' or 3' ends, relative to the the query sequence, the percent identity is corrected by calculating the number of bases of the query sequence that are 5' and 3' of the subject sequence, which are not matched/aligned, as a percent of the total bases of the query sequence. Whether a nucleotide is matched/aligned is determined by results of the FASTDB sequence alignment. This percentage is then subtracted from the percent identity, calculated by the above FASTDB program using the specified parameters, to arrive at a final percent identity score. This corrected score is what is used for the purposes of the present invention. Only bases outside the 5' and 3' bases of the subject sequence, as displayed by the FASTDB alignment, which are not matched/aligned with the query sequence, are calculated for the purposes of manually adjusting the percent identity score.

For example, a 90 base subject sequence is aligned to a 100 base query sequence to determine percent identity. The deletions occur at the 5' end of the subject sequence and therefore, the FASTDB alignment does not show a matched/alignement of the first 10 bases at 5' end. The 10 unpaired bases represent 10% of the sequence (number of bases at the 5' and 3' ends not matched/total number of bases in the query sequence) so 10% is subtracted from the percent identity score calculated by the FASTDB program. If the remaining 90 bases were perfectly matched the final percent identity would be 90%. In another example, a 90 base subject sequence is compared with a 100 base query sequence. This time the deletions are internal deletions so that there are no bases on the 5' or 3' of the subject sequence which are not matched/aligned with the query. In this case the percent identity calculated by FASTDB is not manually corrected. Once again, only bases 5' and 3' of the subject sequence which are not matched/aligned with the query sequnce are manually corrected for. No other manual corrections are to made for the purposes of the present invention.

By a polypeptide having an amino acid sequence at least, for example, 95% "identical" to a query amino acid sequence of the present invention, it is intended that the amino acid sequence of the subject polypeptide is identical to the query sequence except that the subject polypeptide sequence may include up to five amino acid alterations per each 100 amino acids of the query amino acid sequence. In other words, to obtain a polypeptide having an amino acid sequence at least 95% identical to a query

amino acid sequence, up to 5% of the amino acid residues in the subject sequence may be inserted, deleted, (indels) or substituted with another amino acid. These alterations of the reference sequence may occur at the amino or carboxy terminal positions of the reference amino acid sequence or anywhere between those terminal positions, interspersed either individually among residues in the reference sequence or in one or more contiguous groups within the reference sequence.

As a practical matter, whether any particular polypeptide is at least 90%, 95%, 96%, 97%, 98% or 99% identical to, for instance, the amino acid sequences shown in Table 1 or to the amino acid sequence encoded by deposited DNA clone can be determined conventionally using known computer programs. A preferred method for determing the best overall match between a query sequence (a sequence of the present invention) and a subject sequence, also referred to as a global sequence alignment, can be determined using the FASTDB computer program based on the algorithm of Brutlag et al. (Comp. App. Biosci. (1990) 6:237-245). In a sequence alignment the query and subject sequences are either both nucleotide sequences or both amino acid sequences. The result of said global sequence alignment is in percent identity. Preferred parameters used in a FASTDB amino acid alignment are: Matrix=PAM 0, k-tuple=2, Mismatch Penalty=1, Joining Penalty=20, Randomization Group Length=0, Cutoff Score=1, Window Size=sequence length, Gap Penalty=5, Gap Size Penalty=0.05, Window Size=500 or the length of the subject amino acid sequence, whichever is shorter.

If the subject sequence is shorter than the query sequence due to N- or C-terminal deletions, not because of internal deletions, a manual correction must be made to the results. This is becuase the FASTDB program does not account for N- and C-terminal truncations of the subject sequence when calculating global percent identity. For subject sequences truncated at the N- and C-termini, relative to the the query sequence, the percent identity is corrected by calculating the number of residues of the query sequence that are N- and C-terminal of the subject sequence, which are not matched/aligned with a corresponding subject residue, as a percent of the total bases of the query sequence. Whether a residue is matched/aligned is determined by results of the FASTDB sequence alignment. This percentage is then subtracted from the percent identity, calculated by the above FASTDB program using the specified parameters, to arrive at a final percent identity score. This final percent identity score is what is used for the purposes of the present invention. Only residues to the N- and C-termini of the subject sequence, which are not matched/aligned with the query sequence, are considered for the purposes of manually adjusting the percent identity score. That is, only query residue positions outside the farthest N- and C-terminal residues of the subject sequence.

For example, a 90 amino acid residue subject sequence is aligned with a 100 residue query sequence to determine percent identity. The deletion occurs at the N-terminus of the subject sequence and therefore, the FASTDB alignment does not show a matching/alignment of the first 10 residues at the N-terminus. The 10 unpaired residues represent 10% of the sequence (number of residues at the N- and C- termini not matched/total number of residues in the query sequence) so 10% is subtracted from the percent identity score calculated by the FASTDB program. If the remaining 90 residues were perfectly matched the final percent identity would be 90%. In another example, a 90 residue subject sequence is compared with a 100 residue query sequence. This time the deletions are internal deletions so there are no residues at the N- or C-termini of the subject sequence which are not matched/aligned with the query. In this case the percent identity calculated by FASTDB is not manually corrected. Once again, only residue positions outside the N- and C-terminal ends of the subject sequence, as displayed in the FASTDB alignment, which are not matched/aligned with the query sequnce are manually corrected for. No other manual corrections are to made for the purposes of the present invention.

The variants may contain alterations in the coding regions, non-coding regions, or both. Especially preferred are polynucleotide variants containing alterations which produce silent substitutions, additions, or deletions, but do not alter the properties or activities of the encoded polypeptide. Nucleotide variants produced by silent substitutions due to the degeneracy of the genetic code are preferred. Moreover, variants in which 5-10, 1-5, or 1-2 amino acids are substituted, deleted, or added in any combination are also preferred. Polynucleotide variants can be produced for a variety of reasons, e.g., to optimize codon expression for a particular host (change codons in the human mRNA to those preferred by a bacterial host such as E. coli).

Naturally occurring variants are called "allelic variants," and refer to one of several alternate forms of a gene occupying a given locus on a chromosome of an organism. (Genes II, Lewin, B., ed., John Wiley & Sons, New York (1985).) These allelic variants can vary at either the polynucleotide and/or polypeptide level. Alternatively, non-naturally occurring variants may be produced by mutagenesis techniques or by direct synthesis.

Using known methods of protein engineering and recombinant DNA technology, variants may be generated to improve or alter the characteristics of the polypeptides of the present invention. For instance, one or more amino acids can be deleted from the N-terminus or C-terminus of the secreted protein without substantial loss of biological function. The authors of Ron et al., J. Biol. Chem. 268: 2984-2988 (1993), reported variant KGF proteins having heparin binding activity even after

deleting 3, 8, or 27 amino-terminal amino acid residues. Similarly, Interferon gamma exhibited up to ten times higher activity after deleting 8-10 amino acid residues from the carboxy terminus of this protein. (Dobeli et al., J. Biotechnology 7:199-216 (1988).)

Moreover, ample evidence demonstrates that variants often retain a biological activity similar to that of the naturally occurring protein. For example, Gayle and coworkers (J. Biol. Chem 268:22105-22111 (1993)) conducted extensive mutational analysis of human cytokine IL-1a. They used random mutagenesis to generate over 3,500 individual IL-1a mutants that averaged 2.5 amino acid changes per variant over the entire length of the molecule. Multiple mutations were examined at every possible amino acid position. The investigators found that "[m]ost of the molecule could be altered with little effect on either [binding or biological activity]." (See, Abstract.) In fact, only 23 unique amino acid sequences, out of more than 3,500 nucleotide sequences examined, produced a protein that significantly differed in activity from wild-type.

Furthermore, even if deleting one or more amino acids from the N-terminus or C-terminus of a polypeptide results in modification or loss of one or more biological functions, other biological activities may still be retained. For example, the ability of a deletion variant to induce and/or to bind antibodies which recognize the secreted form will likely be retained when less than the majority of the residues of the secreted form are removed from the N-terminus or C-terminus. Whether a particular polypeptide lacking N- or C-terminal residues of a protein retains such immunogenic activities can readily be determined by routine methods described herein and otherwise known in the art.

Thus, the invention further includes polypeptide variants which show substantial biological activity. Such variants include deletions, insertions, inversions, repeats, and substitutions selected according to general rules known in the art so as have little effect on activity. For example, guidance concerning how to make phenotypically silent amino acid substitutions is provided in Bowie, J. U. et al., Science 247:1306-1310 (1990), wherein the authors indicate that there are two main strategies for studying the tolerance of an amino acid sequence to change.

The first strategy exploits the tolerance of amino acid substitutions by natural selection during the process of evolution. By comparing amino acid sequences in different species, conserved amino acids can be identified. These conserved amino acids are likely important for protein function. In contrast, the amino acid positions where substitutions have been tolerated by natural selection indicates that these positions are not critical for protein function. Thus, positions tolerating amino acid substitution could be modified while still maintaining biological activity of the protein.

insert is generated according to the PCR protocol described in Example 1, using PCR primers having restriction sites for NdeI (5' primer) and XbaI, BamHI, XhoI, or Asp718 (3' primer). The PCR insert is gel purified and restricted with compatible enzymes. The insert and vector are ligated according to standard protocols.

The engineered vector could easily be substituted in the above protocol to express protein in a bacterial system.

Example 6: Purification of a Polypeptide from an Inclusion Body

The following alternative method can be used to purify a polypeptide expressed in *E coli* when it is present in the form of inclusion bodies. Unless otherwise specified, all of the following steps are conducted at 4-10°C.

Upon completion of the production phase of the *E. coli* fermentation, the cell culture is cooled to 4-10°C and the cells harvested by continuous centrifugation at 15,000 rpm (Heraeus Sepatech). On the basis of the expected yield of protein per unit weight of cell paste and the amount of purified protein required, an appropriate amount of cell paste, by weight, is suspended in a buffer solution containing 100 mM Tris, 50 mM EDTA, pH 7.4. The cells are dispersed to a homogeneous suspension using a high shear mixer.

The cells are then lysed by passing the solution through a microfluidizer (Microfuidics, Corp. or APV Gaulin, Inc.) twice at 4000-6000 psi. The homogenate is then mixed with NaCl solution to a final concentration of 0.5 M NaCl, followed by centrifugation at 7000 xg for 15 min. The resultant pellet is washed again using 0.5M NaCl, 100 mM Tris, 50 mM EDTA, pH 7.4.

The resulting washed inclusion bodies are solubilized with 1.5 M guanidine hydrochloride (GuHCl) for 2-4 hours. After 7000 xg centrifugation for 15 min., the pellet is discarded and the polypeptide containing supernatant is incubated at 4°C overnight to allow further GuHCl extraction.

Following high speed centrifugation (30,000 xg) to remove insoluble particles, the GuHCl solubilized protein is refolded by quickly mixing the GuHCl extract with 20 volumes of buffer containing 50 mM sodium, pH 4.5, 150 mM NaCl, 2 mM EDTA by vigorous stirring. The refolded diluted protein solution is kept at 4°C without mixing for 12 hours prior to further purification steps.

To clarify the refolded polypeptide solution, a previously prepared tangential filtration unit equipped with 0.16 µm membrane filter with appropriate surface area

(Isopropyl-B-D-thiogalacto pyranoside) is then added to a final concentration of 1 mM. IPTG induces by inactivating the lacI repressor, clearing the P/O leading to increased gene expression.

Cells are grown for an extra 3 to 4 hours. Cells are then harvested by centrifugation (20 mins at 6000Xg). The cell pellet is solubilized in the chaotropic agent 6 Molar Guanidine HCl by stirring for 3-4 hours at 4°C. The cell debris is removed by centrifugation, and the supernatant containing the polypeptide is loaded onto a nickel-nitrilo-tri-acetic acid ("Ni-NTA") affinity resin column (available from QIAGEN, Inc., *supra*). Proteins with a 6 x His tag bind to the Ni-NTA resin with high affinity and can be purified in a simple one-step procedure (for details see: The QIAexpressionist (1995) QIAGEN, Inc., *supra*).

Briefly, the supernatant is loaded onto the column in 6 M guanidine-HCl, pH 8, the column is first washed with 10 volumes of 6 M guanidine-HCl, pH 8, then washed with 10 volumes of 6 M guanidine-HCl pH 6, and finally the polypeptide is eluted with 6 M guanidine-HCl, pH 5.

The purified protein is then renatured by dialyzing it against phosphate-buffered saline (PBS) or 50 mM Na-acetate, pH 6 buffer plus 200 mM NaCl. Alternatively, the protein can be successfully refolded while immobilized on the Ni-NTA column. The recommended conditions are as follows: renature using a linear 6M-1M urea gradient in 500 mM NaCl, 20% glycerol, 20 mM Tris/HCl pH 7.4, containing protease inhibitors. The renaturation should be performed over a period of 1.5 hours or more. After renaturation the proteins are eluted by the addition of 250 mM immidazole. Immidazole is removed by a final dialyzing step against PBS or 50 mM sodium acetate pH 6 buffer plus 200 mM NaCl. The purified protein is stored at 4° C or frozen at -80° C.

In addition to the above expression vector, the present invention further includes an expression vector comprising phage operator and promoter elements operatively linked to a polynucleotide of the present invention, called pHE4a. (ATCC Accession Number 209645, deposited on February 25, 1998.) This vector contains: 1) a neomycinphosphotransferase gene as a selection marker, 2) an E. coli origin of replication, 3) a T5 phage promoter sequence, 4) two lac operator sequences, 5) a Shine-Delgarno sequence, and 6) the lactose operon repressor gene (lacIq). The origin of replication (oriC) is derived from pUC19 (LTI, Gaithersburg, MD). The promoter sequence and operator sequences are made synthetically.

DNA can be inserted into the pHEa by restricting the vector with NdeI and XbaI, BamHI, XhoI, or Asp718, running the restricted product on a gel, and isolating the larger fragment (the stuffer fragment should be about 310 base pairs). The DNA

Example 4: Chromosomal Mapping of the Polynucleotides

An oligonucleotide primer set is designed according to the sequence at the 5' end of SEQ ID NO:X. This primer preferably spans about 100 nucleotides. This primer set is then used in a polymerase chain reaction under the following set of conditions : 30 seconds, 95°C; 1 minute, 56°C; 1 minute, 70°C. This cycle is repeated 32 times followed by one 5 minute cycle at 70°C. Human, mouse, and hamster DNA is used as template in addition to a somatic cell hybrid panel containing individual chromosomes or chromosome fragments (Bios, Inc). The reactions is analyzed on either 8% polyacrylamide gels or 3.5 % agarose gels. Chromosome mapping is determined by the presence of an approximately 100 bp PCR fragment in the particular somatic cell hybrid.

Example 5: Bacterial Expression of a Polypeptide

A polynucleotide encoding a polypeptide of the present invention is amplified using PCR oligonucleotide primers corresponding to the 5' and 3' ends of the DNA sequence, as outlined in Example 1, to synthesize insertion fragments. The primers used to amplify the cDNA insert should preferably contain restriction sites, such as BamHI and XbaI, at the 5' end of the primers in order to clone the amplified product into the expression vector. For example, BamHI and XbaI correspond to the restriction enzyme sites on the bacterial expression vector pQE-9. (Qiagen, Inc., Chatsworth, CA). This plasmid vector encodes antibiotic resistance (Amp^r), a bacterial origin of replication (ori), an IPTG-regulatable promoter/operator (P/O), a ribosome binding site (RBS), a 6-histidine tag (6-His), and restriction enzyme cloning sites.

The pQE-9 vector is digested with BamHI and XbaI and the amplified fragment is ligated into the pQE-9 vector maintaining the reading frame initiated at the bacterial RBS. The ligation mixture is then used to transform the E. coli strain M15/rep4 (Qiagen, Inc.) which contains multiple copies of the plasmid pREP4, which expresses the lacI repressor and also confers kanamycin resistance (Kan^r). Transformants are identified by their ability to grow on LB plates and ampicillin/kanamycin resistant colonies are selected. Plasmid DNA is isolated and confirmed by restriction analysis.

Clones containing the desired constructs are grown overnight (O/N) in liquid culture in LB media supplemented with both Amp (100 ug/ml) and Kan (25 ug/ml). The O/N culture is used to inoculate a large culture at a ratio of 1:100 to 1:250. The cells are grown to an optical density 600 ($O.D.^{600}$) of between 0.4 and 0.6. IPTG

This above method starts with total RNA isolated from the desired source, although poly-A+ RNA can be used. The RNA preparation can then be treated with phosphatase if necessary to eliminate 5' phosphate groups on degraded or damaged RNA which may interfere with the later RNA ligase step. The phosphatase should then be inactivated and the RNA treated with tobacco acid pyrophosphatase in order to remove the cap structure present at the 5' ends of messenger RNAs. This reaction leaves a 5' phosphate group at the 5' end of the cap cleaved RNA which can then be ligated to an RNA oligonucleotide using T4 RNA ligase.

This modified RNA preparation is used as a template for first strand cDNA synthesis using a gene specific oligonucleotide. The first strand synthesis reaction is used as a template for PCR amplification of the desired 5' end using a primer specific to the ligated RNA oligonucleotide and a primer specific to the known sequence of the gene of interest. The resultant product is then sequenced and analyzed to confirm that the 5' end sequence belongs to the desired gene.

Example 2: Isolation of Genomic Clones Corresponding to a Polynucleotide

A human genomic P1 library (Genomic Systems, Inc.) is screened by PCR using primers selected for the cDNA sequence corresponding to SEQ ID NO:X., according to the method described in Example 1. (See also, Sambrook.)

Example 3: Tissue Distribution of Polypeptide

Tissue distribution of mRNA expression of polynucleotides of the present invention is determined using protocols for Northern blot analysis, described by, among others, Sambrook et al. For example, a cDNA probe produced by the method described in Example 1 is labeled with P^{32} using the rediprime™ DNA labeling system (Amersham Life Science), according to manufacturer's instructions. After labeling, the probe is purified using CHROMA SPIN-100™ column (Clontech Laboratories, Inc.), according to manufacturer's protocol number PT1200-1. The purified labeled probe is then used to examine various human tissues for mRNA expression.

Multiple Tissue Northern (MTN) blots containing various human tissues (H) or human immune system tissues (IM) (Clontech) are examined with the labeled probe using ExpressHyb™ hybridization solution (Clontech) according to manufacturer's protocol number PT1190-1. Following hybridization and washing, the blots are mounted and exposed to film at -70°C overnight, and the films developed according to standard procedures.

The plasmid mixture is transformed into a suitable host, as indicated above (such as XL-1 Blue (Stratagene)) using techniques known to those of skill in the art, such as those provided by the vector supplier or in related publications or patents cited above. The transformants are plated on 1.5% agar plates (containing the appropriate selection agent, e.g., ampicillin) to a density of about 150 transformants (colonies) per plate. These plates are screened using Nylon membranes according to routine methods for bacterial colony screening (e.g., Sambrook et al., Molecular Cloning: A Laboratory Manual, 2nd Edit., (1989), Cold Spring Harbor Laboratory Press, pages 1.93 to 1.104), or other techniques known to those of skill in the art.

Alternatively, two primers of 17-20 nucleotides derived from both ends of the SEQ ID NO:X (i.e., within the region of SEQ ID NO:X bounded by the 5' NT and the 3' NT of the clone defined in Table 1) are synthesized and used to amplify the desired cDNA using the deposited cDNA plasmid as a template. The polymerase chain reaction is carried out under routine conditions, for instance, in 25 µl of reaction mixture with 0.5 ug of the above cDNA template. A convenient reaction mixture is 1.5-5 mM $MgCl_2$, 0.01% (w/v) gelatin, 20 µM each of dATP, dCTP, dGTP, dTTP, 25 pmol of each primer and 0.25 Unit of Taq polymerase. Thirty five cycles of PCR (denaturation at 94°C for 1 min; annealing at 55°C for 1 min; elongation at 72°C for 1 min) are performed with a Perkin-Elmer Cetus automated thermal cycler. The amplified product is analyzed by agarose gel electrophoresis and the DNA band with expected molecular weight is excised and purified. The PCR product is verified to be the selected sequence by subcloning and sequencing the DNA product.

Several methods are available for the identification of the 5' or 3' non-coding portions of a gene which may not be present in the deposited clone. These methods include but are not limited to, filter probing, clone enrichment using specific probes, and protocols similar or identical to 5' and 3' "RACE" protocols which are well known in the art. For instance, a method similar to 5' RACE is available for generating the missing 5' end of a desired full-length transcript. (Fromont-Racine et al., Nucleic Acids Res. 21(7):1683-1684 (1993).)

Briefly, a specific RNA oligonucleotide is ligated to the 5' ends of a population of RNA presumably containing full-length gene RNA transcripts. A primer set containing a primer specific to the ligated RNA oligonucleotide and a primer specific to a known sequence of the gene of interest is used to PCR amplify the 5' portion of the desired full-length gene. This amplified product may then be sequenced and used to generate the full length gene.

Blue, also available from Stratagene. pBS comes in 4 forms SK+, SK-, KS+ and KS. The S and K refers to the orientation of the polylinker to the T7 and T3 primer sequences which flank the polylinker region ("S" is for SacI and "K" is for KpnI which are the first sites on each respective end of the linker). "+" or "-" refer to the orientation of the f1 origin of replication ("ori"), such that in one orientation, single stranded rescue initiated from the f1 ori generates sense strand DNA and in the other, antisense.

Vectors pSport1, pCMVSport 2.0 and pCMVSport 3.0, were obtained from Life Technologies, Inc., P. O. Box 6009, Gaithersburg, MD 20897. All Sport vectors contain an ampicillin resistance gene and may be transformed into E. coli strain DH10B, also available from Life Technologies. (See, for instance, Gruber, C. E., et al., Focus 15:59 (1993).) Vector lafmid BA (Bento Soares, Columbia University, NY) contains an ampicillin resistance gene and can be transformed into E. coli strain XL-1 Blue. Vector pCR®2.1, which is available from Invitrogen, 1600 Faraday Avenue, Carlsbad, CA 92008, contains an ampicillin resistance gene and may be transformed into E. coli strain DH10B, available from Life Technologies. (See, for instance, Clark, J. M., Nuc. Acids Res. 16:9677-9686 (1988) and Mead, D. et al., Bio/Technology 9: (1991).) Preferably, a polynucleotide of the present invention does not comprise the phage vector sequences identified for the particular clone in Table 1, as well as the corresponding plasmid vector sequences designated above.

The deposited material in the sample assigned the ATCC Deposit Number cited in Table 1 for any given cDNA clone also may contain one or more additional plasmids, each comprising a cDNA clone different from that given clone. Thus, deposits sharing the same ATCC Deposit Number contain at least a plasmid for each cDNA clone identified in Table 1. Typically, each ATCC deposit sample cited in Table 1 comprises a mixture of approximately equal amounts (by weight) of about 50 plasmid DNAs, each containing a different cDNA clone; but such a deposit sample may include plasmids for more or less than 50 cDNA clones, up to about 500 cDNA clones.

Two approaches can be used to isolate a particular clone from the deposited sample of plasmid DNAs cited for that clone in Table 1. First, a plasmid is directly isolated by screening the clones using a polynucleotide probe corresponding to SEQ ID NO:X.

Particularly, a specific polynucleotide with 30-40 nucleotides is synthesized using an Applied Biosystems DNA synthesizer according to the sequence reported. The oligonucleotide is labeled, for instance, with ^{32}P-γ-ATP using T4 polynucleotide kinase and purified according to routine methods. (E.g., Maniatis et al., Molecular Cloning: A Laboratory Manual, Cold Spring Harbor Press, Cold Spring, NY (1982).)

Also preferred is a method of treatment of an individual in need of an increased level of a secreted protein activity, which method comprises administering to such an individual a pharmaceutical composition comprising an amount of an isolated polypeptide, polynucleotide, or antibody of the claimed invention effective to increase the level of said protein activity in said individual.

Having generally described the invention, the same will be more readily understood by reference to the following examples, which are provided by way of illustration and are not intended as limiting.

Examples

Example 1: Isolation of a Selected cDNA Clone From the Deposited Sample

Each cDNA clone in a cited ATCC deposit is contained in a plasmid vector. Table 1 identifies the vectors used to construct the cDNA library from which each clone was isolated. In many cases, the vector used to construct the library is a phage vector from which a plasmid has been excised. The table immediately below correlates the related plasmid for each phage vector used in constructing the cDNA library. For example, where a particular clone is identified in Table 1 as being isolated in the vector "Lambda Zap," the corresponding deposited clone is in "pBluescript."

Vector Used to Construct Library	Corresponding Deposited Plasmid
Lambda Zap	pBluescript (pBS)
Uni-Zap XR	pBluescript (pBS)
Zap Express	pBK
lafmid BA	plafmid BA
pSport1	pSport1
pCMVSport 2.0	pCMVSport 2.0
pCMVSport 3.0	pCMVSport 3.0
pCR®2.1	pCR®2.1

Vectors Lambda Zap (U.S. Patent Nos. 5,128,256 and 5,286,636), Uni-Zap XR (U.S. Patent Nos. 5,128, 256 and 5,286,636), Zap Express (U.S. Patent Nos. 5,128,256 and 5,286,636), pBluescript (pBS) (Short, J. M. et al., Nucleic Acids Res. 16:7583-7600 (1988); Alting-Mees, M. A. and Short, J. M., Nucleic Acids Res. 17:9494 (1989)) and pBK (Alting-Mees, M. A. et al., Strategies 5:58-61 (1992)) are commercially available from Stratagene Cloning Systems, Inc., 11011 N. Torrey Pines Road, La Jolla, CA, 92037. pBS contains an ampicillin resistance gene and pBK contains a neomycin resistance gene. Both can be transformed into E. coli strain XL-1

Also preferred is an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to a nucleotide sequence encoding a polypeptide wherein said polypeptide comprises an amino acid sequence that is at least 90% identical to a sequence of at least 10 contiguous amino acids in a sequence selected from the group consisting of: an amino acid sequence of SEQ ID NO:Y wherein Y is any integer as defined in Table 1; and a complete amino acid sequence of a secreted protein encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1.

Also preferred is an isolated nucleic acid molecule, wherein said nucleotide sequence encoding a polypeptide has been optimized for expression of said polypeptide in a prokaryotic host.

Also preferred is an isolated nucleic acid molecule, wherein said polypeptide comprises an amino acid sequence selected from the group consisting of: an amino acid sequence of SEQ ID NO:Y wherein Y is any integer as defined in Table 1; and a complete amino acid sequence of a secreted protein encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1.

Further preferred is a method of making a recombinant vector comprising inserting any of the above isolated nucleic acid molecule into a vector. Also preferred is the recombinant vector produced by this method. Also preferred is a method of making a recombinant host cell comprising introducing the vector into a host cell, as well as the recombinant host cell produced by this method.

Also preferred is a method of making an isolated polypeptide comprising culturing this recombinant host cell under conditions such that said polypeptide is expressed and recovering said polypeptide. Also preferred is this method of making an isolated polypeptide, wherein said recombinant host cell is a eukaryotic cell and said polypeptide is a secreted portion of a human secreted protein comprising an amino acid sequence selected from the group consisting of: an amino acid sequence of SEQ ID NO:Y beginning with the residue at the position of the First Amino Acid of the Secreted Portion of SEQ ID NO:Y wherein Y is an integer set forth in Table 1 and said position of the First Amino Acid of the Secreted Portion of SEQ ID NO:Y is defined in Table 1; and an amino acid sequence of a secreted portion of a protein encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1. The isolated polypeptide produced by this method is also preferred.

comprising an amino acid sequence that is at least 90% identical to a sequence of at least 10 contiguous amino acids in a sequence selected from the group consisting of: an amino acid sequence of SEQ ID NO:Y wherein Y is any integer as defined in Table 1; and a complete amino acid sequence of a protein encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1.

Also preferred is the above method wherein said step of comparing sequences is performed by comparing the amino acid sequence determined from a polypeptide molecule in said sample with said sequence selected from said group.

Also preferred is a method for identifying the species, tissue or cell type of a biological sample which method comprises a step of detecting polypeptide molecules in said sample, if any, comprising an amino acid sequence that is at least 90% identical to a sequence of at least 10 contiguous amino acids in a sequence selected from the group consisting of: an amino acid sequence of SEQ ID NO:Y wherein Y is any integer as defined in Table 1; and a complete amino acid sequence of a secreted protein encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1.

Also preferred is the above method for identifying the species, tissue or cell type of a biological sample, which method comprises a step of detecting polypeptide molecules comprising an amino acid sequence in a panel of at least two amino acid sequences, wherein at least one sequence in said panel is at least 90% identical to a sequence of at least 10 contiguous amino acids in a sequence selected from the above group.

Also preferred is a method for diagnosing in a subject a pathological condition associated with abnormal structure or expression of a gene encoding a secreted protein identified in Table 1, which method comprises a step of detecting in a biological sample obtained from said subject polypeptide molecules comprising an amino acid sequence in a panel of at least two amino acid sequences, wherein at least one sequence in said panel is at least 90% identical to a sequence of at least 10 contiguous amino acids in a sequence selected from the group consisting of: an amino acid sequence of SEQ ID NO:Y wherein Y is any integer as defined in Table 1; and a complete amino acid sequence of a secreted protein encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1.

In any of these methods, the step of detecting said polypeptide molecules includes using an antibody.

Also preferred is an isolated polypeptide comprising an amino acid sequence at least 95% identical to a sequence of at least about 30 contiguous amino acids in the amino acid sequence of the secreted portion of the protein encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1.

Also preferred is an isolated polypeptide comprising an amino acid sequence at least 95% identical to a sequence of at least about 100 contiguous amino acids in the amino acid sequence of the secreted portion of the protein encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1.

Also preferred is an isolated polypeptide comprising an amino acid sequence at least 95% identical to the amino acid sequence of the secreted portion of the protein encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1.

Further preferred is an isolated antibody which binds specifically to a polypeptide comprising an amino acid sequence that is at least 90% identical to a sequence of at least 10 contiguous amino acids in a sequence selected from the group consisting of: an amino acid sequence of SEQ ID NO:Y wherein Y is any integer as defined in Table 1; and a complete amino acid sequence of a protein encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1.

Further preferred is a method for detecting in a biological sample a polypeptide comprising an amino acid sequence which is at least 90% identical to a sequence of at least 10 contiguous amino acids in a sequence selected from the group consisting of: an amino acid sequence of SEQ ID NO:Y wherein Y is any integer as defined in Table 1; and a complete amino acid sequence of a protein encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1; which method comprises a step of comparing an amino acid sequence of at least one polypeptide molecule in said sample with a sequence selected from said group and determining whether the sequence of said polypeptide molecule in said sample is at least 90% identical to said sequence of at least 10 contiguous amino acids.

Also preferred is the above method wherein said step of comparing an amino acid sequence of at least one polypeptide molecule in said sample with a sequence selected from said group comprises determining the extent of specific binding of polypeptides in said sample to an antibody which binds specifically to a polypeptide

identical to a sequence of at least 50 contiguous nucleotides in a sequence selected from said group.

Also preferred is a composition of matter comprising isolated nucleic acid molecules wherein the nucleotide sequences of said nucleic acid molecules comprise a panel of at least two nucleotide sequences, wherein at least one sequence in said panel is at least 95% identical to a sequence of at least 50 contiguous nucleotides in a sequence selected from the group consisting of: a nucleotide sequence of SEQ ID NO:X wherein X is any integer as defined in Table 1; and a nucleotide sequence encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1. The nucleic acid molecules can comprise DNA molecules or RNA molecules.

Also preferred is an isolated polypeptide comprising an amino acid sequence at least 90% identical to a sequence of at least about 10 contiguous amino acids in the amino acid sequence of SEQ ID NO:Y wherein Y is any integer as defined in Table 1.

Also preferred is a polypeptide, wherein said sequence of contiguous amino acids is included in the amino acid sequence of SEQ ID NO:Y in the range of positions beginning with the residue at about the position of the First Amino Acid of the Secreted Portion and ending with the residue at about the Last Amino Acid of the Open Reading Frame as set forth for SEQ ID NO:Y in Table 1.

Also preferred is an isolated polypeptide comprising an amino acid sequence at least 95% identical to a sequence of at least about 30 contiguous amino acids in the amino acid sequence of SEQ ID NO:Y.

Further preferred is an isolated polypeptide comprising an amino acid sequence at least 95% identical to a sequence of at least about 100 contiguous amino acids in the amino acid sequence of SEQ ID NO:Y.

Further preferred is an isolated polypeptide comprising an amino acid sequence at least 95% identical to the complete amino acid sequence of SEQ ID NO:Y.

Further preferred is an isolated polypeptide comprising an amino acid sequence at least 90% identical to a sequence of at least about 10 contiguous amino acids in the complete amino acid sequence of a secreted protein encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1.

Also preferred is a polypeptide wherein said sequence of contiguous amino acids is included in the amino acid sequence of a secreted portion of the secreted protein encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1.

comprises a step of comparing a nucleotide sequence of at least one nucleic acid molecule in said sample with a sequence selected from said group and determining whether the sequence of said nucleic acid molecule in said sample is at least 95% identical to said selected sequence.

Also preferred is the above method wherein said step of comparing sequences comprises determining the extent of nucleic acid hybridization between nucleic acid molecules in said sample and a nucleic acid molecule comprising said sequence selected from said group. Similarly, also preferred is the above method wherein said step of comparing sequences is performed by comparing the nucleotide sequence determined from a nucleic acid molecule in said sample with said sequence selected from said group. The nucleic acid molecules can comprise DNA molecules or RNA molecules.

A further preferred embodiment is a method for identifying the species, tissue or cell type of a biological sample which method comprises a step of detecting nucleic acid molecules in said sample, if any, comprising a nucleotide sequence that is at least 95% identical to a sequence of at least 50 contiguous nucleotides in a sequence selected from the group consisting of: a nucleotide sequence of SEQ ID NO:X wherein X is any integer as defined in Table 1; and a nucleotide sequence encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1.

The method for identifying the species, tissue or cell type of a biological sample can comprise a step of detecting nucleic acid molecules comprising a nucleotide sequence in a panel of at least two nucleotide sequences, wherein at least one sequence in said panel is at least 95% identical to a sequence of at least 50 contiguous nucleotides in a sequence selected from said group.

Also preferred is a method for diagnosing in a subject a pathological condition associated with abnormal structure or expression of a gene encoding a secreted protein identified in Table 1, which method comprises a step of detecting in a biological sample obtained from said subject nucleic acid molecules, if any, comprising a nucleotide sequence that is at least 95% identical to a sequence of at least 50 contiguous nucleotides in a sequence selected from the group consisting of: a nucleotide sequence of SEQ ID NO:X wherein X is any integer as defined in Table 1; and a nucleotide sequence encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1.

The method for diagnosing a pathological condition can comprise a step of detecting nucleic acid molecules comprising a nucleotide sequence in a panel of at least two nucleotide sequences, wherein at least one sequence in said panel is at least 95%

A further preferred embodiment is an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to the complete nucleotide sequence of SEQ ID NO:X.

Also preferred is an isolated nucleic acid molecule which hybridizes under stringent hybridization conditions to a nucleic acid molecule, wherein said nucleic acid molecule which hybridizes does not hybridize under stringent hybridization conditions to a nucleic acid molecule having a nucleotide sequence consisting of only A residues or of only T residues.

Also preferred is a composition of matter comprising a DNA molecule which comprises a human cDNA clone identified by a cDNA Clone Identifier in Table 1, which DNA molecule is contained in the material deposited with the American Type Culture Collection and given the ATCC Deposit Number shown in Table 1 for said cDNA Clone Identifier.

Also preferred is an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to a sequence of at least 50 contiguous nucleotides in the nucleotide sequence of a human cDNA clone identified by a cDNA Clone Identifier in Table 1, which DNA molecule is contained in the deposit given the ATCC Deposit Number shown in Table 1.

Also preferred is an isolated nucleic acid molecule, wherein said sequence of at least 50 contiguous nucleotides is included in the nucleotide sequence of the complete open reading frame sequence encoded by said human cDNA clone.

Also preferred is an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to sequence of at least 150 contiguous nucleotides in the nucleotide sequence encoded by said human cDNA clone.

A further preferred embodiment is an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to sequence of at least 500 contiguous nucleotides in the nucleotide sequence encoded by said human cDNA clone.

A further preferred embodiment is an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to the complete nucleotide sequence encoded by said human cDNA clone.

A further preferred embodiment is a method for detecting in a biological sample a nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to a sequence of at least 50 contiguous nucleotides in a sequence selected from the group consisting of: a nucleotide sequence of SEQ ID NO:X wherein X is any integer as defined in Table 1; and a nucleotide sequence encoded by a human cDNA clone identified by a cDNA Clone Identifier in Table 1 and contained in the deposit with the ATCC Deposit Number shown for said cDNA clone in Table 1; which method

Other Preferred Embodiments

Other preferred embodiments of the claimed invention include an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to a sequence of at least about 50 contiguous nucleotides in the nucleotide sequence of SEQ ID NO:X wherein X is any integer as defined in Table 1.

Also preferred is a nucleic acid molecule wherein said sequence of contiguous nucleotides is included in the nucleotide sequence of SEQ ID NO:X in the range of positions beginning with the nucleotide at about the position of the 5' Nucleotide of the Clone Sequence and ending with the nucleotide at about the position of the 3' Nucleotide of the Clone Sequence as defined for SEQ ID NO:X in Table 1.

Also preferred is a nucleic acid molecule wherein said sequence of contiguous nucleotides is included in the nucleotide sequence of SEQ ID NO:X in the range of positions beginning with the nucleotide at about the position of the 5' Nucleotide of the Start Codon and ending with the nucleotide at about the position of the 3' Nucleotide of the Clone Sequence as defined for SEQ ID NO:X in Table 1.

Similarly preferred is a nucleic acid molecule wherein said sequence of contiguous nucleotides is included in the nucleotide sequence of SEQ ID NO:X in the range of positions beginning with the nucleotide at about the position of the 5' Nucleotide of the First Amino Acid of the Signal Peptide and ending with the nucleotide at about the position of the 3' Nucleotide of the Clone Sequence as defined for SEQ ID NO:X in Table 1.

Also preferred is an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to a sequence of at least about 150 contiguous nucleotides in the nucleotide sequence of SEQ ID NO:X.

Further preferred is an isolated nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to a sequence of at least about 500 contiguous nucleotides in the nucleotide sequence of SEQ ID NO:X.

A further preferred embodiment is a nucleic acid molecule comprising a nucleotide sequence which is at least 95% identical to the nucleotide sequence of SEQ ID NO:X beginning with the nucleotide at about the position of the 5' Nucleotide of the First Amino Acid of the Signal Peptide and ending with the nucleotide at about the position of the 3' Nucleotide of the Clone Sequence as defined for SEQ ID NO:X in Table 1.

Preferably, an ELISA assay can measure polypeptide level or activity in a sample (e.g., biological sample) using a monoclonal or polyclonal antibody. The antibody can measure polypeptide level or activity by either binding, directly or indirectly, to the polypeptide or by competing with the polypeptide for a substrate.

All of these above assays can be used as diagnostic or prognostic markers. The molecules discovered using these assays can be used to treat disease or to bring about a particular result in a patient (e.g., blood vessel growth) by activating or inhibiting the polypeptide/molecule. Moreover, the assays can discover agents which may inhibit or enhance the production of the polypeptide from suitably manipulated cells or tissues.

Therefore, the invention includes a method of identifying compounds which bind to a polypeptide of the invention comprising the steps of: (a) incubating a candidate binding compound with a polypeptide of the invention; and (b) determining if binding has occurred. Moreover, the invention includes a method of identifying agonists/antagonists comprising the steps of: (a) incubating a candidate compound with a polypeptide of the invention, (b) assaying a biological activity , and (b) determining if a biological activity of the polypeptide has been altered.

Other Activities

A polypeptide or polynucleotide of the present invention may also increase or decrease the differentiation or proliferation of embryonic stem cells, besides, as discussed above, hematopoietic lineage.

A polypeptide or polynucleotide of the present invention may also be used to modulate mammalian characteristics, such as body height, weight, hair color, eye color, skin, percentage of adipose tissue, pigmentation, size, and shape (e.g., cosmetic surgery). Similarly, a polypeptide or polynucleotide of the present invention may be used to modulate mammalian metabolism affecting catabolism, anabolism, processing, utilization, and storage of energy.

A polypeptide or polynucleotide of the present invention may be used to change a mammal's mental state or physical state by influencing biorhythms, caricadic rhythms, depression (including depressive disorders), tendency for violence, tolerance for pain, reproductive capabilities (preferably by Activin or Inhibin-like activity), hormonal or endocrine levels, appetite, libido, memory, stress, or other cognitive qualities.

A polypeptide or polynucleotide of the present invention may also be used as a food additive or preservative, such as to increase or decrease storage capabilities, fat content, lipid, protein, carbohydrate, vitamins, minerals, cofactors or other nutritional components.

It is also contemplated that a polynucleotide or polypeptide of the present invention may inhibit chemotactic activity. These molecules could also be used to treat disorders. Thus, a polynucleotide or polypeptide of the present invention could be used as an inhibitor of chemotaxis.

Binding Activity

A polypeptide of the present invention may be used to screen for molecules that bind to the polypeptide or for molecules to which the polypeptide binds. The binding of the polypeptide and the molecule may activate (agonist), increase, inhibit (antagonist), or decrease activity of the polypeptide or the molecule bound. Examples of such molecules include antibodies, oligonucleotides, proteins (e.g., receptors),or small molecules.

Preferably, the molecule is closely related to the natural ligand of the polypeptide, e.g., a fragment of the ligand, or a natural substrate, a ligand, a structural or functional mimetic. (See, Coligan et al., Current Protocols in Immunology 1(2):Chapter 5 (1991).) Similarly, the molecule can be closely related to the natural receptor to which the polypeptide binds, or at least, a fragment of the receptor capable of being bound by the polypeptide (e.g., active site). In either case, the molecule can be rationally designed using known techniques.

Preferably, the screening for these molecules involves producing appropriate cells which express the polypeptide, either as a secreted protein or on the cell membrane. Preferred cells include cells from mammals, yeast, Drosophila, or *E. coli*. Cells expressing the polypeptide (or cell membrane containing the expressed polypeptide) are then preferably contacted with a test compound potentially containing the molecule to observe binding, stimulation, or inhibition of activity of either the polypeptide or the molecule.

The assay may simply test binding of a candidate compound to the polypeptide, wherein binding is detected by a label, or in an assay involving competition with a labeled competitor. Further, the assay may test whether the candidate compound results in a signal generated by binding to the polypeptide.

Alternatively, the assay can be carried out using cell-free preparations, polypeptide/molecule affixed to a solid support, chemical libraries, or natural product mixtures. The assay may also simply comprise the steps of mixing a candidate compound with a solution containing a polypeptide, measuring polypeptide/molecule activity or binding, and comparing the polypeptide/molecule activity or binding to a standard.

or cardiac), vascular (including vascular endothelium), nervous, hematopoietic, and skeletal (bone, cartilage, tendon, and ligament) tissue. Preferably, regeneration occurs without or decreased scarring. Regeneration also may include angiogenesis.

Moreover, a polynucleotide or polypeptide of the present invention may increase regeneration of tissues difficult to heal. For example, increased tendon/ligament regeneration would quicken recovery time after damage. A polynucleotide or polypeptide of the present invention could also be used prophylactically in an effort to avoid damage. Specific diseases that could be treated include of tendinitis, carpal tunnel syndrome, and other tendon or ligament defects. A further example of tissue regeneration of non-healing wounds includes pressure ulcers, ulcers associated with vascular insufficiency, surgical, and traumatic wounds.

Similarly, nerve and brain tissue could also be regenerated by using a polynucleotide or polypeptide of the present invention to proliferate and differentiate nerve cells. Diseases that could be treated using this method include central and peripheral nervous system diseases, neuropathies, or mechanical and traumatic disorders (e.g., spinal cord disorders, head trauma, cerebrovascular disease, and stoke). Specifically, diseases associated with peripheral nerve injuries, peripheral neuropathy (e.g., resulting from chemotherapy or other medical therapies), localized neuropathies, and central nervous system diseases (e.g., Alzheimer's disease, Parkinson's disease, Huntington's disease, amyotrophic lateral sclerosis, and Shy-Drager syndrome), could all be treated using the polynucleotide or polypeptide of the present invention.

Chemotaxis

A polynucleotide or polypeptide of the present invention may have chemotaxis activity. A chemotaxic molecule attracts or mobilizes cells (e.g., monocytes, fibroblasts, neutrophils, T-cells, mast cells, eosinophils, epithelial and/or endothelial cells) to a particular site in the body, such as inflammation, infection, or site of hyperproliferation. The mobilized cells can then fight off and/or heal the particular trauma or abnormality.

A polynucleotide or polypeptide of the present invention may increase chemotaxic activity of particular cells. These chemotactic molecules can then be used to treat inflammation, infection, hyperproliferative disorders, or any immune system disorder by increasing the number of cells targeted to a particular location in the body. For example, chemotaxic molecules can be used to treat wounds and other trauma to tissues by attracting immune cells to the injured location. Chemotactic molecules of the present invention can also attract fibroblasts, which can be used to treat wounds.

related infections), paronychia, prosthesis-related infections, Reiter's Disease, respiratory tract infections, such as Whooping Cough or Empyema, sepsis, Lyme Disease, Cat-Scratch Disease, Dysentery, Paratyphoid Fever, food poisoning, Typhoid. pneumonia, Gonorrhea, meningitis, Chlamydia, Syphilis, Diphtheria. Leprosy, Paratuberculosis, Tuberculosis, Lupus, Botulism, gangrene, tetanus, impetigo, Rheumatic Fever, Scarlet Fever, sexually transmitted diseases, skin diseases (e.g., cellulitis, dermatocycoses), toxemia, urinary tract infections, wound infections. A polypeptide or polynucleotide of the present invention can be used to treat or detect any of these symptoms or diseases.

Moreover, parasitic agents causing disease or symptoms that can be treated or detected by a polynucleotide or polypeptide of the present invention include, but not limited to, the following families: Amebiasis, Babesiosis, Coccidiosis, Cryptosporidiosis, Dientamoebiasis, Dourine, Ectoparasitic, Giardiasis, Helminthiasis, Leishmaniasis, Theileriasis, Toxoplasmosis, Trypanosomiasis, and Trichomonas. These parasites can cause a variety of diseases or symptoms, including, but not limited to: Scabies, Trombiculiasis, eye infections, intestinal disease (e.g., dysentery, giardiasis), liver disease, lung disease, opportunistic infections (e.g., AIDS related), Malaria, pregnancy complications, and toxoplasmosis. A polypeptide or polynucleotide of the present invention can be used to treat or detect any of these symptoms or diseases.

Preferably, treatment using a polypeptide or polynucleotide of the present invention could either be by administering an effective amount of a polypeptide to the patient, or by removing cells from the patient, supplying the cells with a polynucleotide of the present invention, and returning the engineered cells to the patient (ex vivo therapy). Moreover, the polypeptide or polynucleotide of the present invention can be used as an antigen in a vaccine to raise an immune response against infectious disease.

Regeneration

A polynucleotide or polypeptide of the present invention can be used to differentiate, proliferate, and attract cells, leading to the regeneration of tissues. (See, Science 276:59-87 (1997).) The regeneration of tissues could be used to repair, replace, or protect tissue damaged by congenital defects, trauma (wounds, burns, incisions, or ulcers), age, disease (e.g. osteoporosis, osteocarthritis, periodontal disease, liver failure), surgery, including cosmetic plastic surgery, fibrosis, reperfusion injury, or systemic cytokine damage.

Tissues that could be regenerated using the present invention include organs (e.g., pancreas, liver, intestine, kidney, skin, endothelium), muscle (smooth, skeletal

may be treated. The immune response may be increased by either enhancing an existing immune response, or by initiating a new immune response. Alternatively, the polypeptide or polynucleotide of the present invention may also directly inhibit the infectious agent, without necessarily eliciting an immune response.

Viruses are one example of an infectious agent that can cause disease or symptoms that can be treated or detected by a polynucleotide or polypeptide of the present invention. Examples of viruses, include, but are not limited to the following DNA and RNA viral families: Arbovirus, Adenoviridae, Arenaviridae, Arterivirus, Birnaviridae, Bunyaviridae, Caliciviridae, Circoviridae, Coronaviridae, Flaviviridae, Hepadnaviridae (Hepatitis), Herpesviridae (such as, Cytomegalovirus, Herpes Simplex, Herpes Zoster), Mononegavirus (e.g., Paramyxoviridae, Morbillivirus, Rhabdoviridae), Orthomyxoviridae (e.g., Influenza), Papovaviridae, Parvoviridae, Picornaviridae, Poxviridae (such as Smallpox or Vaccinia), Reoviridae (e.g., Rotavirus), Retroviridae (HTLV-I, HTLV-II, Lentivirus), and Togaviridae (e.g., Rubivirus). Viruses falling within these families can cause a variety of diseases or symptoms, including, but not limited to: arthritis, bronchiollitis, encephalitis, eye infections (e.g., conjunctivitis, keratitis), chronic fatigue syndrome, hepatitis (A, B, C, E, Chronic Active, Delta), meningitis, opportunistic infections (e.g., AIDS), pneumonia, Burkitt's Lymphoma, chickenpox , hemorrhagic fever, Measles, Mumps, Parainfluenza, Rabies, the common cold, Polio, leukemia, Rubella, sexually transmitted diseases, skin diseases (e.g., Kaposi's, warts), and viremia. A polypeptide or polynucleotide of the present invention can be used to treat or detect any of these symptoms or diseases.

Similarly, bacterial or fungal agents that can cause disease or symptoms and that can be treated or detected by a polynucleotide or polypeptide of the present invention include, but not limited to, the following Gram-Negative and Gram-positive bacterial families and fungi: Actinomycetales (e.g., Corynebacterium, Mycobacterium, Norcardia), Aspergillosis, Bacillaceae (e.g., Anthrax, Clostridium), Bacteroidaceae, Blastomycosis, Bordetella, Borrelia, Brucellosis, Candidiasis, Campylobacter, Coccidioidomycosis, Cryptococcosis, Dermatocycoses, Enterobacteriaceae (Klebsiella, Salmonella, Serratia, Yersinia), Erysipelothrix, Helicobacter, Legionellosis, Leptospirosis, Listeria, Mycoplasmatales, Neisseriaceae (e.g., Acinetobacter, Gonorrhea, Menigococcal), Pasteurellacea Infections (e.g., Actinobacillus, Heamophilus, Pasteurella), Pseudomonas, Rickettsiaceae, Chlamydiaceae, Syphilis, and Staphylococcal. These bacterial or fungal families can cause the following diseases or symptoms, including, but not limited to: bacteremia, endocarditis, eye infections (conjunctivitis, tuberculosis, uveitis), gingivitis, opportunistic infections (e.g., AIDS

shock, sepsis, or systemic inflammatory response syndrome (SIRS)), ischemia-reperfusion injury, endotoxin lethality, arthritis, complement-mediated hyperacute rejection, nephritis, cytokine or chemokine induced lung injury, inflammatory bowel disease, Crohn's disease, or resulting from over production of cytokines (e.g., TNF or IL-1.)

Hyperproliferative Disorders

A polypeptide or polynucleotide can be used to treat or detect hyperproliferative disorders, including neoplasms. A polypeptide or polynucleotide of the present invention may inhibit the proliferation of the disorder through direct or indirect interactions. Alternatively, a polypeptide or polynucleotide of the present invention may proliferate other cells which can inhibit the hyperproliferative disorder.

For example, by increasing an immune response, particularly increasing antigenic qualities of the hyperproliferative disorder or by proliferating, differentiating, or mobilizing T-cells, hyperproliferative disorders can be treated. This immune response may be increased by either enhancing an existing immune response, or by initiating a new immune response. Alternatively, decreasing an immune response may also be a method of treating hyperproliferative disorders, such as a chemotherapeutic agent.

Examples of hyperproliferative disorders that can be treated or detected by a polynucleotide or polypeptide of the present invention include, but are not limited to neoplasms located in the: abdomen, bone, breast, digestive system, liver, pancreas, peritoneum, endocrine glands (adrenal, parathyroid, pituitary, testicles, ovary, thymus, thyroid), eye, head and neck, nervous (central and peripheral), lymphatic system, pelvic, skin, soft tissue, spleen, thoracic, and urogenital.

Similarly, other hyperproliferative disorders can also be treated or detected by a polynucleotide or polypeptide of the present invention. Examples of such hyperproliferative disorders include, but are not limited to: hypergammaglobulinemia, lymphoproliferative disorders, paraproteinemias, purpura, sarcoidosis, Sezary Syndrome, Waldenstron's Macroglobulinemia, Gaucher's Disease, histiocytosis, and any other hyperproliferative disease, besides neoplasia, located in an organ system listed above.

Infectious Disease

A polypeptide or polynucleotide of the present invention can be used to treat or detect infectious agents. For example, by increasing the immune response, particularly increasing the proliferation and differentiation of B and/or T cells, infectious diseases

decrease hemostatic or thrombolytic activity could be used to inhibit or dissolve clotting. These molecules could be important in the treatment of heart attacks (infarction), strokes, or scarring.

A polynucleotide or polypeptide of the present invention may also be useful in treating or detecting autoimmune disorders. Many autoimmune disorders result from inappropriate recognition of self as foreign material by immune cells. This inappropriate recognition results in an immune response leading to the destruction of the host tissue. Therefore, the administration of a polypeptide or polynucleotide of the present invention that inhibits an immune response, particularly the proliferation, differentiation, or chemotaxis of T-cells, may be an effective therapy in preventing autoimmune disorders.

Examples of autoimmune disorders that can be treated or detected by the present invention include, but are not limited to: Addison's Disease, hemolytic anemia, antiphospholipid syndrome, rheumatoid arthritis, dermatitis, allergic encephalomyelitis, glomerulonephritis, Goodpasture's Syndrome, Graves' Disease, Multiple Sclerosis, Myasthenia Gravis, Neuritis, Ophthalmia, Bullous Pemphigoid, Pemphigus, Polyendocrinopathies, Purpura, Reiter's Disease, Stiff-Man Syndrome, Autoimmune Thyroiditis, Systemic Lupus Erythematosus, Autoimmune Pulmonary Inflammation, Guillain-Barre Syndrome, insulin dependent diabetes mellitis, and autoimmune inflammatory eye disease.

Similarly, allergic reactions and conditions, such as asthma (particularly allergic asthma) or other respiratory problems, may also be treated by a polypeptide or polynucleotide of the present invention. Moreover, these molecules can be used to treat anaphylaxis, hypersensitivity to an antigenic molecule, or blood group incompatibility.

A polynucleotide or polypeptide of the present invention may also be used to treat and/or prevent organ rejection or graft-versus-host disease (GVHD). Organ rejection occurs by host immune cell destruction of the transplanted tissue through an immune response. Similarly, an immune response is also involved in GVHD, but, in this case, the foreign transplanted immune cells destroy the host tissues. The administration of a polypeptide or polynucleotide of the present invention that inhibits an immune response, particularly the proliferation, differentiation, or chemotaxis of T-cells, may be an effective therapy in preventing organ rejection or GVHD.

Similarly, a polypeptide or polynucleotide of the present invention may also be used to modulate inflammation. For example, the polypeptide or polynucleotide may inhibit the proliferation and differentiation of cells involved in an inflammatory response. These molecules can be used to treat inflammatory conditions, both chronic and acute conditions, including inflammation associated with infection (e.g., septic

Biological Activities

The polynucleotides and polypeptides of the present invention can be used in assays to test for one or more biological activities. If these polynucleotides and polypeptides do exhibit activity in a particular assay, it is likely that these molecules may be involved in the diseases associated with the biological activity. Thus, the polynucleotides and polypeptides could be used to treat the associated disease.

Immune Activity

A polypeptide or polynucleotide of the present invention may be useful in treating deficiencies or disorders of the immune system, by activating or inhibiting the proliferation, differentiation, or mobilization (chemotaxis) of immune cells. Immune cells develop through a process called hematopoiesis, producing myeloid (platelets, red blood cells, neutrophils, and macrophages) and lymphoid (B and T lymphocytes) cells from pluripotent stem cells. The etiology of these immune deficiencies or disorders may be genetic, somatic, such as cancer or some autoimmune disorders, acquired (e.g., by chemotherapy or toxins), or infectious. Moreover, a polynucleotide or polypeptide of the present invention can be used as a marker or detector of a particular immune system disease or disorder.

A polynucleotide or polypeptide of the present invention may be useful in treating or detecting deficiencies or disorders of hematopoietic cells. A polypeptide or polynucleotide of the present invention could be used to increase differentiation and proliferation of hematopoietic cells, including the pluripotent stem cells, in an effort to treat those disorders associated with a decrease in certain (or many) types hematopoietic cells. Examples of immunologic deficiency syndromes include, but are not limited to: blood protein disorders (e.g. agammaglobulinemia, dysgammaglobulinemia), ataxia telangiectasia, common variable immunodeficiency, Digeorge Syndrome, HIV infection, HTLV-BLV infection, leukocyte adhesion deficiency syndrome, lymphopenia, phagocyte bactericidal dysfunction, severe combined immunodeficiency (SCIDs), Wiskott-Aldrich Disorder, anemia, thrombocytopenia, or hemoglobinuria.

Moreover, a polypeptide or polynucleotide of the present invention could also be used to modulate hemostatic (the stopping of bleeding) or thrombolytic activity (clot formation). For example, by increasing hemostatic or thrombolytic activity, a polynucleotide or polypeptide of the present invention could be used to treat blood coagulation disorders (e.g., afibrinogenemia, factor deficiencies), blood platelet disorders (e.g. thrombocytopenia), or wounds resulting from trauma, surgery, or other causes. Alternatively, a polynucleotide or polypeptide of the present invention that can

resonance, is introduced (for example, parenterally, subcutaneously, or intraperitoneally) into the mammal. It will be understood in the art that the size of the subject and the imaging system used will determine the quantity of imaging moiety needed to produce diagnostic images. In the case of a radioisotope moiety, for a human subject, the quantity of radioactivity injected will normally range from about 5 to 20 millicuries of 99mTc. The labeled antibody or antibody fragment will then preferentially accumulate at the location of cells which contain the specific protein. In vivo tumor imaging is described in S.W. Burchiel et al., "Immunopharmacokinetics of Radiolabeled Antibodies and Their Fragments." (Chapter 13 in Tumor Imaging: The Radiochemical Detection of Cancer, S.W. Burchiel and B. A. Rhodes, eds., Masson Publishing Inc. (1982).)

Thus, the invention provides a diagnostic method of a disorder, which involves (a) assaying the expression of a polypeptide of the present invention in cells or body fluid of an individual; (b) comparing the level of gene expression with a standard gene expression level, whereby an increase or decrease in the assayed polypeptide gene expression level compared to the standard expression level is indicative of a disorder.

Moreover, polypeptides of the present invention can be used to treat disease. For example, patients can be administered a polypeptide of the present invention in an effort to replace absent or decreased levels of the polypeptide (e.g., insulin), to supplement absent or decreased levels of a different polypeptide (e.g., hemoglobin S for hemoglobin B), to inhibit the activity of a polypeptide (e.g., an oncogene), to activate the activity of a polypeptide (e.g., by binding to a receptor), to reduce the activity of a membrane bound receptor by competing with it for free ligand (e.g., soluble TNF receptors used in reducing inflammation), or to bring about a desired response (e.g., blood vessel growth).

Similarly, antibodies directed to a polypeptide of the present invention can also be used to treat disease. For example, administration of an antibody directed to a polypeptide of the present invention can bind and reduce overproduction of the polypeptide. Similarly, administration of an antibody can activate the polypeptide, such as by binding to a polypeptide bound to a membrane (receptor).

At the very least, the polypeptides of the present invention can be used as molecular weight markers on SDS-PAGE gels or on molecular sieve gel filtration columns using methods well known to those of skill in the art. Polypeptides can also be used to raise antibodies, which in turn are used to measure protein expression from a recombinant cell, as a way of assessing transformation of the host cell. Moreover, the polypeptides of the present invention can be used to test the following biological activities.

unknown origin. Appropriate reagents can comprise, for example, DNA probes or primers specific to particular tissue prepared from the sequences of the present invention. Panels of such reagents can identify tissue by species and/or by organ type. In a similar fashion, these reagents can be used to screen tissue cultures for contamination.

In the very least, the polynucleotides of the present invention can be used as molecular weight markers on Southern gels, as diagnostic probes for the presence of a specific mRNA in a particular cell type, as a probe to "subtract-out" known sequences in the process of discovering novel polynucleotides, for selecting and making oligomers for attachment to a "gene chip" or other support, to raise anti-DNA antibodies using DNA immunization techniques, and as an antigen to elicit an immune response.

Uses of the Polypeptides

Each of the polypeptides identified herein can be used in numerous ways. The following description should be considered exemplary and utilizes known techniques.

A polypeptide of the present invention can be used to assay protein levels in a biological sample using antibody-based techniques. For example, protein expression in tissues can be studied with classical immunohistological methods. (Jalkanen, M., et al., J. Cell. Biol. 101:976-985 (1985); Jalkanen, M., et al., J. Cell . Biol. 105:3087-3096 (1987).) Other antibody-based methods useful for detecting protein gene expression include immunoassays, such as the enzyme linked immunosorbent assay (ELISA) and the radioimmunoassay (RIA). Suitable antibody assay labels are known in the art and include enzyme labels, such as, glucose oxidase, and radioisotopes, such as iodine (125I, 121I), carbon (14C), sulfur (35S), tritium (3H), indium (112In), and technetium (99mTc), and fluorescent labels, such as fluorescein and rhodamine, and biotin.

In addition to assaying secreted protein levels in a biological sample, proteins can also be detected in vivo by imaging. Antibody labels or markers for in vivo imaging of protein include those detectable by X-radiography, NMR or ESR. For X-radiography, suitable labels include radioisotopes such as barium or cesium, which emit detectable radiation but are not overtly harmful to the subject. Suitable markers for NMR and ESR include those with a detectable characteristic spin, such as deuterium, which may be incorporated into the antibody by labeling of nutrients for the relevant hybridoma.

A protein-specific antibody or antibody fragment which has been labeled with an appropriate detectable imaging moiety, such as a radioisotope (for example, 131I, 112In, 99mTc), a radio-opaque substance, or a material detectable by nuclear magnetic

systems, and the information disclosed herein can be used to design antisense or triple helix polynucleotides in an effort to treat disease.

Polynucleotides of the present invention are also useful in gene therapy. One goal of gene therapy is to insert a normal gene into an organism having a defective gene, in an effort to correct the genetic defect. The polynucleotides disclosed in the present invention offer a means of targeting such genetic defects in a highly accurate manner. Another goal is to insert a new gene that was not present in the host genome, thereby producing a new trait in the host cell.

The polynucleotides are also useful for identifying individuals from minute biological samples. The United States military, for example, is considering the use of restriction fragment length polymorphism (RFLP) for identification of its personnel. In this technique, an individual's genomic DNA is digested with one or more restriction enzymes, and probed on a Southern blot to yield unique bands for identifying personnel. This method does not suffer from the current limitations of "Dog Tags" which can be lost, switched, or stolen, making positive identification difficult. The polynucleotides of the present invention can be used as additional DNA markers for RFLP.

The polynucleotides of the present invention can also be used as an alternative to RFLP, by determining the actual base-by-base DNA sequence of selected portions of an individual's genome. These sequences can be used to prepare PCR primers for amplifying and isolating such selected DNA, which can then be sequenced. Using this technique, individuals can be identified because each individual will have a unique set of DNA sequences. Once an unique ID database is established for an individual, positive identification of that individual, living or dead, can be made from extremely small tissue samples.

Forensic biology also benefits from using DNA-based identification techniques as disclosed herein. DNA sequences taken from very small biological samples such as tissues, e.g., hair or skin, or body fluids, e.g., blood, saliva, semen, etc., can be amplified using PCR. In one prior art technique, gene sequences amplified from polymorphic loci, such as DQa class II HLA gene, are used in forensic biology to identify individuals. (Erlich, H., PCR Technology, Freeman and Co. (1992).) Once these specific polymorphic loci are amplified, they are digested with one or more restriction enzymes, yielding an identifying set of bands on a Southern blot probed with DNA corresponding to the DQa class II HLA gene. Similarly, polynucleotides of the present invention can be used as polymorphic markers for forensic purposes.

There is also a need for reagents capable of identifying the source of a particular tissue. Such need arises, for example, in forensics when presented with tissue of

more likely conserved within gene families, thus increasing the chance of cross hybridization during chromosomal mapping.

Once a polynucleotide has been mapped to a precise chromosomal location, the physical position of the polynucleotide can be used in linkage analysis. Linkage analysis establishes coinheritance between a chromosomal location and presentation of a particular disease. (Disease mapping data are found, for example, in V. McKusick, Mendelian Inheritance in Man (available on line through Johns Hopkins University Welch Medical Library) .) Assuming 1 megabase mapping resolution and one gene per 20 kb, a cDNA precisely localized to a chromosomal region associated with the disease could be one of 50-500 potential causative genes.

Thus, once coinheritance is established, differences in the polynucleotide and the corresponding gene between affected and unaffected individuals can be examined. First, visible structural alterations in the chromosomes, such as deletions or translocations, are examined in chromosome spreads or by PCR. If no structural alterations exist, the presence of point mutations are ascertained. Mutations observed in some or all affected individuals, but not in normal individuals, indicates that the mutation may cause the disease. However, complete sequencing of the polypeptide and the corresponding gene from several normal individuals is required to distinguish the mutation from a polymorphism. If a new polymorphism is identified, this polymorphic polypeptide can be used for further linkage analysis.

Furthermore, increased or decreased expression of the gene in affected individuals as compared to unaffected individuals can be assessed using polynucleotides of the present invention. Any of these alterations (altered expression, chromosomal rearrangement, or mutation) can be used as a diagnostic or prognostic marker.

In addition to the foregoing, a polynucleotide can be used to control gene expression through triple helix formation or antisense DNA or RNA. Both methods rely on binding of the polynucleotide to DNA or RNA. For these techniques, preferred polynucleotides are usually 20 to 40 bases in length and complementary to either the region of the gene involved in transcription (triple helix - see Lee et al., Nucl. Acids Res. 6:3073 (1979); Cooney et al., Science 241:456 (1988); and Dervan et al., Science 251:1360 (1991)) or to the mRNA itself (antisense - Okano, J. Neurochem. 56:560 (1991); Oligodeoxy-nucleotides as Antisense Inhibitors of Gene Expression, CRC Press, Boca Raton, FL (1988).) Triple helix formation optimally results in a shut-off of RNA transcription from DNA, while antisense RNA hybridization blocks translation of an mRNA molecule into polypeptide. Both techniques are effective in model

after translation in all eukaryotic cells. While the N-terminal methionine on most proteins also is efficiently removed in most prokaryotes, for some proteins, this prokaryotic removal process is inefficient, depending on the nature of the amino acid to which the N-terminal methionine is covalently linked.

Uses of the Polynucleotides

Each of the polynucleotides identified herein can be used in numerous ways as reagents. The following description should be considered exemplary and utilizes known techniques.

The polynucleotides of the present invention are useful for chromosome identification. There exists an ongoing need to identify new chromosome markers, since few chromosome marking reagents, based on actual sequence data (repeat polymorphisms), are presently available. Each polynucleotide of the present invention can be used as a chromosome marker.

Briefly, sequences can be mapped to chromosomes by preparing PCR primers (preferably 15-25 bp) from the sequences shown in SEQ ID NO:X. Primers can be selected using computer analysis so that primers do not span more than one predicted exon in the genomic DNA. These primers are then used for PCR screening of somatic cell hybrids containing individual human chromosomes. Only those hybrids containing the human gene corresponding to the SEQ ID NO:X will yield an amplified fragment.

Similarly, somatic hybrids provide a rapid method of PCR mapping the polynucleotides to particular chromosomes. Three or more clones can be assigned per day using a single thermal cycler. Moreover, sublocalization of the polynucleotides can be achieved with panels of specific chromosome fragments. Other gene mapping strategies that can be used include in situ hybridization, prescreening with labeled flow-sorted chromosomes, and preselection by hybridization to construct chromosome specific-cDNA libraries.

Precise chromosomal location of the polynucleotides can also be achieved using fluorescence in situ hybridization (FISH) of a metaphase chromosomal spread. This technique uses polynucleotides as short as 500 or 600 bases; however, polynucleotides 2,000-4,000 bp are preferred. For a review of this technique, see Verma et al., "Human Chromosomes: a Manual of Basic Techniques," Pergamon Press, New York (1988).

For chromosome mapping, the polynucleotides can be used individually (to mark a single chromosome or a single site on that chromosome) or in panels (for marking multiple sites and/or multiple chromosomes). Preferred polynucleotides correspond to the noncoding regions of the cDNAs because the coding sequences are

genes for culturing in E. coli and other bacteria. Representative examples of appropriate hosts include, but are not limited to, bacterial cells, such as E. coli, Streptomyces and Salmonella typhimurium cells; fungal cells, such as yeast cells; insect cells such as Drosophila S2 and Spodoptera Sf9 cells; animal cells such as CHO, COS, 293, and Bowes melanoma cells; and plant cells. Appropriate culture mediums and conditions for the above-described host cells are known in the art.

Among vectors preferred for use in bacteria include pQE70, pQE60 and pQE-9, available from QIAGEN, Inc.; pBluescript vectors, Phagescript vectors, pNH8A, pNH16a, pNH18A, pNH46A, available from Stratagene Cloning Systems, Inc.; and ptrc99a, pKK223-3, pKK233-3, pDR540, pRIT5 available from Pharmacia Biotech, Inc. Among preferred eukaryotic vectors are pWLNEO, pSV2CAT, pOG44, pXT1 and pSG available from Stratagene; and pSVK3, pBPV, pMSG and pSVL available from Pharmacia. Other suitable vectors will be readily apparent to the skilled artisan.

Introduction of the construct into the host cell can be effected by calcium phosphate transfection, DEAE-dextran mediated transfection, cationic lipid-mediated transfection, electroporation, transduction, infection, or other methods. Such methods are described in many standard laboratory manuals, such as Davis et al., Basic Methods In Molecular Biology (1986). It is specifically contemplated that the polypeptides of the present invention may in fact be expressed by a host cell lacking a recombinant vector.

A polypeptide of this invention can be recovered and purified from recombinant cell cultures by well-known methods including ammonium sulfate or ethanol precipitation, acid extraction, anion or cation exchange chromatography, phosphocellulose chromatography, hydrophobic interaction chromatography, affinity chromatography, hydroxylapatite chromatography and lectin chromatography. Most preferably, high performance liquid chromatography ("HPLC") is employed for purification.

Polypeptides of the present invention, and preferably the secreted form, can also be recovered from: products purified from natural sources, including bodily fluids, tissues and cells, whether directly isolated or cultured; products of chemical synthetic procedures; and products produced by recombinant techniques from a prokaryotic or eukaryotic host, including, for example, bacterial, yeast, higher plant, insect, and mammalian cells. Depending upon the host employed in a recombinant production procedure, the polypeptides of the present invention may be glycosylated or may be non-glycosylated. In addition, polypeptides of the invention may also include an initial modified methionine residue, in some cases as a result of host-mediated processes. Thus, it is well known in the art that the N-terminal methionine encoded by the translation initiation codon generally is removed with high efficiency from any protein

Bennett et al., J. Molecular Recognition 8:52-58 (1995); K. Johanson et al., J. Biol. Chem. 270:9459-9471 (1995).)

Moreover, the polypeptides of the present invention can be fused to marker sequences, such as a peptide which facilitates purification of the fused polypeptide. In preferred embodiments, the marker amino acid sequence is a hexa-histidine peptide, such as the tag provided in a pQE vector (QIAGEN, Inc., 9259 Eton Avenue, Chatsworth, CA, 91311), among others, many of which are commercially available. As described in Gentz et al., Proc. Natl. Acad. Sci. USA 86:821-824 (1989), for instance, hexa-histidine provides for convenient purification of the fusion protein. Another peptide tag useful for purification, the "HA" tag, corresponds to an epitope derived from the influenza hemagglutinin protein. (Wilson et al., Cell 37:767 (1984).)

Thus, any of these above fusions can be engineered using the polynucleotides or the polypeptides of the present invention.

Vectors, Host Cells, and Protein Production

The present invention also relates to vectors containing the polynucleotide of the present invention, host cells, and the production of polypeptides by recombinant techniques. The vector may be, for example, a phage, plasmid, viral, or retroviral vector. Retroviral vectors may be replication competent or replication defective. In the latter case, viral propagation generally will occur only in complementing host cells.

The polynucleotides may be joined to a vector containing a selectable marker for propagation in a host. Generally, a plasmid vector is introduced in a precipitate, such as a calcium phosphate precipitate, or in a complex with a charged lipid. If the vector is a virus, it may be packaged in vitro using an appropriate packaging cell line and then transduced into host cells.

The polynucleotide insert should be operatively linked to an appropriate promoter, such as the phage lambda PL promoter, the E. coli lac, trp, phoA and tac promoters, the SV40 early and late promoters and promoters of retroviral LTRs, to name a few. Other suitable promoters will be known to the skilled artisan. The expression constructs will further contain sites for transcription initiation, termination, and, in the transcribed region, a ribosome binding site for translation. The coding portion of the transcripts expressed by the constructs will preferably include a translation initiating codon at the beginning and a termination codon (UAA, UGA or UAG) appropriately positioned at the end of the polypeptide to be translated.

As indicated, the expression vectors will preferably include at least one selectable marker. Such markers include dihydrofolate reductase, G418 or neomycin resistance for eukaryotic cell culture and tetracycline, kanamycin or ampicillin resistance

polypeptide of the present invention can be used to indirectly detect the second protein by binding to the polypeptide. Moreover, because secreted proteins target cellular locations based on trafficking signals, the polypeptides of the present invention can be used as targeting molecules once fused to other proteins.

Examples of domains that can be fused to polypeptides of the present invention include not only heterologous signal sequences, but also other heterologous functional regions. The fusion does not necessarily need to be direct, but may occur through linker sequences.

Moreover, fusion proteins may also be engineered to improve characteristics of the polypeptide of the present invention. For instance, a region of additional amino acids, particularly charged amino acids, may be added to the N-terminus of the polypeptide to improve stability and persistence during purification from the host cell or subsequent handling and storage. Also, peptide moieties may be added to the polypeptide to facilitate purification. Such regions may be removed prior to final preparation of the polypeptide. The addition of peptide moieties to facilitate handling of polypeptides are familiar and routine techniques in the art.

Moreover, polypeptides of the present invention, including fragments, and specifically epitopes, can be combined with parts of the constant domain of immunoglobulins (IgG), resulting in chimeric polypeptides. These fusion proteins facilitate purification and show an increased half-life in vivo. One reported example describes chimeric proteins consisting of the first two domains of the human CD4-polypeptide and various domains of the constant regions of the heavy or light chains of mammalian immunoglobulins. (EP A 394,827; Traunecker et al., Nature 331:84-86 (1988).) Fusion proteins having disulfide-linked dimeric structures (due to the IgG) can also be more efficient in binding and neutralizing other molecules, than the monomeric secreted protein or protein fragment alone. (Fountoulakis et al., J. Biochem. 270:3958-3964 (1995).)

Similarly, EP-A-O 464 533 (Canadian counterpart 2045869) discloses fusion proteins comprising various portions of constant region of immunoglobulin molecules together with another human protein or part thereof. In many cases, the Fc part in a fusion protein is beneficial in therapy and diagnosis, and thus can result in, for example, improved pharmacokinetic properties. (EP-A 0232 262.) Alternatively, deleting the Fc part after the fusion protein has been expressed, detected, and purified, would be desired. For example, the Fc portion may hinder therapy and diagnosis if the fusion protein is used as an antigen for immunizations. In drug discovery, for example, human proteins, such as hIL-5, have been fused with Fc portions for the purpose of high-throughput screening assays to identify antagonists of hIL-5. (See, D.

epitope, as well as the polynucleotide encoding this fragment. A region of a protein molecule to which an antibody can bind is defined as an "antigenic epitope." In contrast, an "immunogenic epitope" is defined as a part of a protein that elicits an antibody response. (See, for instance, Geysen et al., Proc. Natl. Acad. Sci. USA 81:3998- 4002 (1983).)

Fragments which function as epitopes may be produced by any conventional means. (See, e.g., Houghten, R. A., Proc. Natl. Acad. Sci. USA 82:5131-5135 (1985) further described in U.S. Patent No. 4,631,211.)

In the present invention, antigenic epitopes preferably contain a sequence of at least seven, more preferably at least nine, and most preferably between about 15 to about 30 amino acids. Antigenic epitopes are useful to raise antibodies, including monoclonal antibodies, that specifically bind the epitope. (See, for instance, Wilson et al., Cell 37:767-778 (1984); Sutcliffe, J. G. et al., Science 219:660-666 (1983).)

Similarly, immunogenic epitopes can be used to induce antibodies according to methods well known in the art. (See, for instance, Sutcliffe et al., supra; Wilson et al., supra; Chow, M. et al., Proc. Natl. Acad. Sci. USA 82:910-914; and Bittle, F. J. et al., J. Gen. Virol. 66:2347-2354 (1985).) A preferred immunogenic epitope includes the secreted protein. The immunogenic epitopes may be presented together with a carrier protein, such as an albumin, to an animal system (such as rabbit or mouse) or, if it is long enough (at least about 25 amino acids), without a carrier. However, immunogenic epitopes comprising as few as 8 to 10 amino acids have been shown to be sufficient to raise antibodies capable of binding to, at the very least, linear epitopes in a denatured polypeptide (e.g., in Western blotting.)

As used herein, the term "antibody" (Ab) or "monoclonal antibody" (Mab) is meant to include intact molecules as well as antibody fragments (such as, for example, Fab and F(ab')2 fragments) which are capable of specifically binding to protein. Fab and F(ab')2 fragments lack the Fc fragment of intact antibody, clear more rapidly from the circulation, and may have less non-specific tissue binding than an intact antibody. (Wahl et al., J. Nucl. Med. 24:316-325 (1983).) Thus, these fragments are preferred, as well as the products of a FAB or other immunoglobulin expression library. Moreover, antibodies of the present invention include chimeric, single chain, and humanized antibodies.

Fusion Proteins

Any polypeptide of the present invention can be used to generate fusion proteins. For example, the polypeptide of the present invention, when fused to a second protein, can be used as an antigenic tag. Antibodies raised against the

carboxy terminus, or both. For example, any number of amino acids, ranging from 1-60, can be deleted from the amino terminus of either the secreted polypeptide or the mature form. Similarly, any number of amino acids, ranging from 1-30, can be deleted from the carboxy terminus of the secreted protein or mature form. Furthermore, any combination of the above amino and carboxy terminus deletions are preferred. Similarly, polynucleotide fragments encoding these polypeptide fragments are also preferred.

Particularly, N-terminal deletions of the polypeptide of the present invention can be described by the general formula m-p, where p is the total number of amino acids in the polypeptide and m is an integer from 2 to (p-1), and where both of these integers (m & p) correspond to the position of the amino acid residue identified in SEQ ID NO:Y.

Moreover, C-terminal deletions of the polypeptide of the present invention can also be described by the general formula 1-n, where n is an integer from 2 to (p-1), and again where these integers (n & p) correspond to the position of the amino acid residue identified in SEQ ID NO:Y.

The invention also provides polypeptides having one or more amino acids deleted from both the amino and the carboxyl termini, which may be described generally as having residues m-n of SEQ ID NO:Y, where m and n are integers as described above.

Also preferred are polypeptide and polynucleotide fragments characterized by structural or functional domains, such as fragments that comprise alpha-helix and alpha-helix forming regions, beta-sheet and beta-sheet-forming regions, turn and turn-forming regions, coil and coil-forming regions, hydrophilic regions, hydrophobic regions, alpha amphipathic regions, beta amphipathic regions, flexible regions, surface-forming regions, substrate binding region, and high antigenic index regions. Polypeptide fragments of SEQ ID NO:Y falling within conserved domains are specifically contemplated by the present invention. Moreover, polynucleotide fragments encoding these domains are also contemplated.

Other preferred fragments are biologically active fragments. Biologically active fragments are those exhibiting activity similar, but not necessarily identical, to an activity of the polypeptide of the present invention. The biological activity of the fragments may include an improved desired activity, or a decreased undesirable activity.

Epitopes & Antibodies

In the present invention, "epitopes" refer to polypeptide fragments having antigenic or immunogenic activity in an animal, especially in a human. A preferred embodiment of the present invention relates to a polypeptide fragment comprising an

Polynucleotide and Polypeptide Fragments

In the present invention, a "polynucleotide fragment" refers to a short polynucleotide having a nucleic acid sequence contained in the deposited clone or shown in SEQ ID NO:X. The short nucleotide fragments are preferably at least about 15 nt, and more preferably at least about 20 nt, still more preferably at least about 30 nt, and even more preferably, at least about 40 nt in length. A fragment "at least 20 nt in length," for example, is intended to include 20 or more contiguous bases from the cDNA sequence contained in the deposited clone or the nucleotide sequence shown in SEQ ID NO:X. These nucleotide fragments are useful as diagnostic probes and primers as discussed herein. Of course, larger fragments (e.g., 50, 150, 500, 600, 2000 nucleotides) are preferred.

Moreover, representative examples of polynucleotide fragments of the invention, include, for example, fragments having a sequence from about nucleotide number 1-50, 51-100, 101-150, 151-200, 201-250, 251-300, 301-350, 351-400, 401-450, 451-500, 501-550, 551-600, 651-700, 701-750, 751-800, 800-850, 851-900, 901-950, 951-1000, 1001-1050, 1051-1100, 1101-1150, 1151-1200, 1201-1250, 1251-1300, 1301-1350, 1351-1400, 1401-1450, 1451-1500, 1501-1550, 1551-1600, 1601-1650, 1651-1700, 1701-1750, 1751-1800, 1801-1850, 1851-1900, 1901-1950, 1951-2000, or 2001 to the end of SEQ ID NO:X or the cDNA contained in the deposited clone. In this context "about" includes the particularly recited ranges, larger or smaller by several (5, 4, 3, 2, or 1) nucleotides, at either terminus or at both termini. Preferably, these fragments encode a polypeptide which has biological activity. More preferably, these polynucleotides can be used as probes or primers as discussed herein.

In the present invention, a "polypeptide fragment" refers to a short amino acid sequence contained in SEQ ID NO:Y or encoded by the cDNA contained in the deposited clone. Protein fragments may be "free-standing," or comprised within a larger polypeptide of which the fragment forms a part or region, most preferably as a single continuous region. Representative examples of polypeptide fragments of the invention, include, for example, fragments from about amino acid number 1-20, 21-40, 41-60, 61-80, 81-100, 102-120, 121-140, 141-160, or 161 to the end of the coding region. Moreover, polypeptide fragments can be about 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, or 150 amino acids in length. In this context "about" includes the particularly recited ranges, larger or smaller by several (5, 4, 3, 2, or 1) amino acids, at either extreme or at both extremes.

Preferred polypeptide fragments include the secreted protein as well as the mature form. Further preferred polypeptide fragments include the secreted protein or the mature form having a continuous series of deleted residues from the amino or the

The second strategy uses genetic engineering to introduce amino acid changes at specific positions of a cloned gene to identify regions critical for protein function. For example, site directed mutagenesis or alanine-scanning mutagenesis (introduction of single alanine mutations at every residue in the molecule) can be used. (Cunningham and Wells, Science 244:1081-1085 (1989).) The resulting mutant molecules can then be tested for biological activity.

As the authors state, these two strategies have revealed that proteins are surprisingly tolerant of amino acid substitutions. The authors further indicate which amino acid changes are likely to be permissive at certain amino acid positions in the protein. For example, most buried (within the tertiary structure of the protein) amino acid residues require nonpolar side chains, whereas few features of surface side chains are generally conserved. Moreover, tolerated conservative amino acid substitutions involve replacement of the aliphatic or hydrophobic amino acids Ala, Val, Leu and Ile; replacement of the hydroxyl residues Ser and Thr; replacement of the acidic residues Asp and Glu; replacement of the amide residues Asn and Gln, replacement of the basic residues Lys, Arg, and His; replacement of the aromatic residues Phe, Tyr, and Trp, and replacement of the small-sized amino acids Ala, Ser, Thr, Met, and Gly.

Besides conservative amino acid substitution, variants of the present invention include (i) substitutions with one or more of the non-conserved amino acid residues, where the substituted amino acid residues may or may not be one encoded by the genetic code, or (ii) substitution with one or more of amino acid residues having a substituent group, or (iii) fusion of the mature polypeptide with another compound, such as a compound to increase the stability and/or solubility of the polypeptide (for example, polyethylene glycol), or (iv) fusion of the polypeptide with additional amino acids, such as an IgG Fc fusion region peptide, or leader or secretory sequence, or a sequence facilitating purification. Such variant polypeptides are deemed to be within the scope of those skilled in the art from the teachings herein.

For example, polypeptide variants containing amino acid substitutions of charged amino acids with other charged or neutral amino acids may produce proteins with improved characteristics, such as less aggregation. Aggregation of pharmaceutical formulations both reduces activity and increases clearance due to the aggregate's immunogenic activity. (Pinckard et al., Clin. Exp. Immunol. 2:331-340 (1967); Robbins et al., Diabetes 36: 838-845 (1987); Cleland et al., Crit. Rev. Therapeutic Drug Carrier Systems 10:307-377 (1993).)

(e.g., Filtron), equilibrated with 40 mM sodium acetate, pH 6.0 is employed. The filtered sample is loaded onto a cation exchange resin (e.g., Poros HS-50, Perseptive Biosystems). The column is washed with 40 mM sodium acetate, pH 6.0 and eluted with 250 mM, 500 mM, 1000 mM, and 1500 mM NaCl in the same buffer, in a stepwise manner. The absorbance at 280 nm of the effluent is continuously monitored. Fractions are collected and further analyzed by SDS-PAGE.

Fractions containing the polypeptide are then pooled and mixed with 4 volumes of water. The diluted sample is then loaded onto a previously prepared set of tandem columns of strong anion (Poros HQ-50, Perseptive Biosystems) and weak anion (Poros CM-20, Perseptive Biosystems) exchange resins. The columns are equilibrated with 40 mM sodium acetate, pH 6.0. Both columns are washed with 40 mM sodium acetate, pH 6.0, 200 mM NaCl. The CM-20 column is then eluted using a 10 column volume linear gradient ranging from 0.2 M NaCl, 50 mM sodium acetate, pH 6.0 to 1.0 M NaCl, 50 mM sodium acetate, pH 6.5. Fractions are collected under constant A_{280} monitoring of the effluent. Fractions containing the polypeptide (determined, for instance, by 16% SDS-PAGE) are then pooled.

The resultant polypeptide should exhibit greater than 95% purity after the above refolding and purification steps. No major contaminant bands should be observed from Commassie blue stained 16% SDS-PAGE gel when 5 µg of purified protein is loaded. The purified protein can also be tested for endotoxin/LPS contamination, and typically the LPS content is less than 0.1 ng/ml according to LAL assays.

Example 7: Cloning and Expression of a Polypeptide in a Baculovirus Expression System

In this example, the plasmid shuttle vector pA2 is used to insert a polynucleotide into a baculovirus to express a polypeptide. This expression vector contains the strong polyhedrin promoter of the *Autographa californica* nuclear polyhedrosis virus (AcMNPV) followed by convenient restriction sites such as BamHI, Xba I and Asp718. The polyadenylation site of the simian virus 40 ("SV40") is used for efficient polyadenylation. For easy selection of recombinant virus, the plasmid contains the beta-galactosidase gene from *E. coli* under control of a weak Drosophila promoter in the same orientation, followed by the polyadenylation signal of the polyhedrin gene. The inserted genes are flanked on both sides by viral sequences for cell-mediated homologous recombination with wild-type viral DNA to generate a viable virus that express the cloned polynucleotide.

Many other baculovirus vectors can be used in place of the vector above, such as pAc373, pVL941, and pAcIM1, as one skilled in the art would readily appreciate, as long as the construct provides appropriately located signals for transcription, translation, secretion and the like, including a signal peptide and an in-frame AUG as required. Such vectors are described, for instance, in Luckow et al., Virology 170:31-39 (1989).

Specifically, the cDNA sequence contained in the deposited clone, including the AUG initiation codon and the naturally associated leader sequence identified in Table 1, is amplified using the PCR protocol described in Example 1. If the naturally occurring signal sequence is used to produce the secreted protein, the pA2 vector does not need a second signal peptide. Alternatively, the vector can be modified (pA2 GP) to include a baculovirus leader sequence, using the standard methods described in Summers et al., "A Manual of Methods for Baculovirus Vectors and Insect Cell Culture Procedures," Texas Agricultural Experimental Station Bulletin No. 1555 (1987).

The amplified fragment is isolated from a 1% agarose gel using a commercially available kit ("Geneclean," BIO 101 Inc., La Jolla, Ca.). The fragment then is digested with appropriate restriction enzymes and again purified on a 1% agarose gel.

The plasmid is digested with the corresponding restriction enzymes and optionally, can be dephosphorylated using calf intestinal phosphatase, using routine procedures known in the art. The DNA is then isolated from a 1% agarose gel using a commercially available kit ("Geneclean" BIO 101 Inc., La Jolla, Ca.).

The fragment and the dephosphorylated plasmid are ligated together with T4 DNA ligase. *E. coli* HB101 or other suitable *E. coli* hosts such as XL-1 Blue (Stratagene Cloning Systems, La Jolla, CA) cells are transformed with the ligation mixture and spread on culture plates. Bacteria containing the plasmid are identified by digesting DNA from individual colonies and analyzing the digestion product by gel electrophoresis. The sequence of the cloned fragment is confirmed by DNA sequencing.

Five µg of a plasmid containing the polynucleotide is co-transfected with 1.0 µg of a commercially available linearized baculovirus DNA ("BaculoGold™ baculovirus DNA", Pharmingen, San Diego, CA), using the lipofection method described by Felgner et al., Proc. Natl. Acad. Sci. USA 84:7413-7417 (1987). One µg of BaculoGold™ virus DNA and 5 µg of the plasmid are mixed in a sterile well of a microtiter plate containing 50 µl of serum-free Grace's medium (Life Technologies Inc., Gaithersburg, MD). Afterwards, 10 µl Lipofectin plus 90 µl Grace's medium are added, mixed and incubated for 15 minutes at room temperature. Then the transfection mixture is added drop-wise to Sf9 insect cells (ATCC CRL 1711) seeded in a 35 mm

tissue culture plate with 1 ml Grace's medium without serum. The plate is then incubated for 5 hours at 27° C. The transfection solution is then removed from the plate and 1 ml of Grace's insect medium supplemented with 10% fetal calf serum is added. Cultivation is then continued at 27° C for four days.

After four days the supernatant is collected and a plaque assay is performed, as described by Summers and Smith, *supra*. An agarose gel with "Blue Gal" (Life Technologies Inc., Gaithersburg) is used to allow easy identification and isolation of gal-expressing clones, which produce blue-stained plaques. (A detailed description of a "plaque assay" of this type can also be found in the user's guide for insect cell culture and baculovirology distributed by Life Technologies Inc., Gaithersburg, page 9-10.) After appropriate incubation, blue stained plaques are picked with the tip of a micropipettor (e.g., Eppendorf). The agar containing the recombinant viruses is then resuspended in a microcentrifuge tube containing 200 µl of Grace's medium and the suspension containing the recombinant baculovirus is used to infect Sf9 cells seeded in 35 mm dishes. Four days later the supernatants of these culture dishes are harvested and then they are stored at 4° C.

To verify the expression of the polypeptide, Sf9 cells are grown in Grace's medium supplemented with 10% heat-inactivated FBS. The cells are infected with the recombinant baculovirus containing the polynucleotide at a multiplicity of infection ("MOI") of about 2. If radiolabeled proteins are desired, 6 hours later the medium is removed and is replaced with SF900 II medium minus methionine and cysteine (available from Life Technologies Inc., Rockville, MD). After 42 hours, 5 µCi of ^{35}S-methionine and 5 µCi ^{35}S-cysteine (available from Amersham) are added. The cells are further incubated for 16 hours and then are harvested by centrifugation. The proteins in the supernatant as well as the intracellular proteins are analyzed by SDS-PAGE followed by autoradiography (if radiolabeled).

Microsequencing of the amino acid sequence of the amino terminus of purified protein may be used to determine the amino terminal sequence of the produced protein.

Example 8: Expression of a Polypeptide in Mammalian Cells

The polypeptide of the present invention can be expressed in a mammalian cell. A typical mammalian expression vector contains a promoter element, which mediates

the initiation of transcription of mRNA, a protein coding sequence, and signals required for the termination of transcription and polyadenylation of the transcript. Additional elements include enhancers, Kozak sequences and intervening sequences flanked by donor and acceptor sites for RNA splicing. Highly efficient transcription is achieved with the early and late promoters from SV40, the long terminal repeats (LTRs) from Retroviruses, e.g., RSV, HTLVI, HIVI and the early promoter of the cytomegalovirus (CMV). However, cellular elements can also be used (e.g., the human actin promoter).

Suitable expression vectors for use in practicing the present invention include, for example, vectors such as pSVL and pMSG (Pharmacia, Uppsala, Sweden), pRSVcat (ATCC 37152), pSV2dhfr (ATCC 37146), pBC12MI (ATCC 67109), pCMVSport 2.0, and pCMVSport 3.0. Mammalian host cells that could be used include, human Hela, 293, H9 and Jurkat cells, mouse NIH3T3 and C127 cells, Cos 1, Cos 7 and CV1, quail QC1-3 cells, mouse L cells and Chinese hamster ovary (CHO) cells.

Alternatively, the polypeptide can be expressed in stable cell lines containing the polynucleotide integrated into a chromosome. The co-transfection with a selectable marker such as dhfr, gpt, neomycin, hygromycin allows the identification and isolation of the transfected cells.

The transfected gene can also be amplified to express large amounts of the encoded protein. The DHFR (dihydrofolate reductase) marker is useful in developing cell lines that carry several hundred or even several thousand copies of the gene of interest. (See, e.g., Alt, F. W., et al., J. Biol. Chem. 253:1357-1370 (1978); Hamlin, J. L. and Ma, C., Biochem. et Biophys. Acta, 1097:107-143 (1990); Page, M. J. and Sydenham, M. A., Biotechnology 9:64-68 (1991).) Another useful selection marker is the enzyme glutamine synthase (GS) (Murphy et al., Biochem J. 227:277-279 (1991); Bebbington et al., Bio/Technology 10:169-175 (1992). Using these markers, the mammalian cells are grown in selective medium and the cells with the highest resistance are selected. These cell lines contain the amplified gene(s) integrated into a chromosome. Chinese hamster ovary (CHO) and NSO cells are often used for the production of proteins.

Derivatives of the plasmid pSV2-dhfr (ATCC Accession No. 37146), the expression vectors pC4 (ATCC Accession No. 209646) and pC6 (ATCC Accession No.209647) contain the strong promoter (LTR) of the Rous Sarcoma Virus (Cullen et al., Molecular and Cellular Biology, 438-447 (March, 1985)) plus a fragment of the CMV-enhancer (Boshart et al., Cell 41:521-530 (1985).) Multiple cloning sites, e.g., with the restriction enzyme cleavage sites BamHI, XbaI and Asp718, facilitate the cloning of the gene of interest. The vectors also contain the 3' intron, the

polyadenylation and termination signal of the rat preproinsulin gene, and the mouse DHFR gene under control of the SV40 early promoter.

Specifically, the plasmid pC6, for example, is digested with appropriate restriction enzymes and then dephosphorylated using calf intestinal phosphates by procedures known in the art. The vector is then isolated from a 1% agarose gel.

A polynucleotide of the present invention is amplified according to the protocol outlined in Example 1. If the naturally occurring signal sequence is used to produce the secreted protein, the vector does not need a second signal peptide. Alternatively, if the naturally occurring signal sequence is not used, the vector can be modified to include a heterologous signal sequence. (See, e.g., WO 96/34891.)

The amplified fragment is isolated from a 1% agarose gel using a commercially available kit ("Geneclean," BIO 101 Inc., La Jolla, Ca.). The fragment then is digested with appropriate restriction enzymes and again purified on a 1% agarose gel.

The amplified fragment is then digested with the same restriction enzyme and purified on a 1% agarose gel. The isolated fragment and the dephosphorylated vector are then ligated with T4 DNA ligase. *E. coli* HB101 or XL-1 Blue cells are then transformed and bacteria are identified that contain the fragment inserted into plasmid pC6 using, for instance, restriction enzyme analysis.

Chinese hamster ovary cells lacking an active DHFR gene is used for transfection. Five µg of the expression plasmid pC6 is cotransfected with 0.5 µg of the plasmid pSVneo using lipofectin (Felgner et al., *supra*). The plasmid pSV2-neo contains a dominant selectable marker, the *neo* gene from Tn5 encoding an enzyme that confers resistance to a group of antibiotics including G418. The cells are seeded in alpha minus MEM supplemented with 1 mg/ml G418. After 2 days, the cells are trypsinized and seeded in hybridoma cloning plates (Greiner, Germany) in alpha minus MEM supplemented with 10, 25, or 50 ng/ml of metothrexate plus 1 mg/ml G418. After about 10-14 days single clones are trypsinized and then seeded in 6-well petri dishes or 10 ml flasks using different concentrations of methotrexate (50 nM, 100 nM, 200 nM, 400 nM, 800 nM). Clones growing at the highest concentrations of methotrexate are then transferred to new 6-well plates containing even higher concentrations of methotrexate (1 µM, 2 µM, 5 µM, 10 mM, 20 mM). The same procedure is repeated until clones are obtained which grow at a concentration of 100 - 200 µM. Expression of the desired gene product is analyzed, for instance, by SDS-PAGE and Western blot or by reversed phase HPLC analysis.

Example 9: Protein Fusions

The polypeptides of the present invention are preferably fused to other proteins. These fusion proteins can be used for a variety of applications. For example, fusion of the present polypeptides to His-tag, HA-tag, protein A, IgG domains, and maltose binding protein facilitates purification. (See Example 5; see also EP A 394,827; Traunecker, et al., Nature 331:84-86 (1988).) Similarly, fusion to IgG-1, IgG-3, and albumin increases the halflife time in vivo. Nuclear localization signals fused to the polypeptides of the present invention can target the protein to a specific subcellular localization, while covalent heterodimer or homodimers can increase or decrease the activity of a fusion protein. Fusion proteins can also create chimeric molecules having more than one function. Finally, fusion proteins can increase solubility and/or stability of the fused protein compared to the non-fused protein. All of the types of fusion proteins described above can be made by modifying the following protocol, which outlines the fusion of a polypeptide to an IgG molecule, or the protocol described in Example 5.

Briefly, the human Fc portion of the IgG molecule can be PCR amplified, using primers that span the 5' and 3' ends of the sequence described below. These primers also should have convenient restriction enzyme sites that will facilitate cloning into an expression vector, preferably a mammalian expression vector.

For example, if pC4 (Accession No. 209646) is used, the human Fc portion can be ligated into the BamHI cloning site. Note that the 3' BamHI site should be destroyed. Next, the vector containing the human Fc portion is re-restricted with BamHI, linearizing the vector, and a polynucleotide of the present invention, isolated by the PCR protocol described in Example 1, is ligated into this BamHI site. Note that the polynucleotide is cloned without a stop codon, otherwise a fusion protein will not be produced.

If the naturally occurring signal sequence is used to produce the secreted protein, pC4 does not need a second signal peptide. Alternatively, if the naturally occurring signal sequence is not used, the vector can be modified to include a heterologous signal sequence. (See, e.g., WO 96/34891.)

Human IgG Fc region:
GGGATCCGGAGCCCAAATCTTCTGACAAAACTCACACATGCCCACCGTGCC
CAGCACCTGAATTCGAGGGTGCACCGTCAGTCTTCCTCTTCCCCCCAAAACC
CAAGGACACCCTCATGATCTCCCGGACTCCTGAGGTCACATGCGTGGTGGT
GGACGTAAGCCACGAAGACCCTGAGGTCAAGTTCAACTGGTACGTGGACG
GCGTGGAGGTGCATAATGCCAAGACAAAGCCGCGGGAGGAGCAGTACAAC

AGCACGTACCGTGTGGTCAGCGTCCTCACCGTCCTGCACCAGGACTGGCTG
AATGGCAAGGAGTACAAGTGCAAGGTCTCCAACAAAGCCCTCCCAACCCCC
ATCGAGAAAACCATCTCCAAAGCCAAAGGGCAGCCCCGAGAACCACAGGT
GTACACCCTGCCCCCATCCCGGGATGAGCTGACCAAGAACCAGGTCAGCCT
GACCTGCCTGGTCAAAGGCTTCTATCCAAGCGACATCGCCGTGGAGTGGGA
GAGCAATGGGCAGCCGGAGAACAACTACAAGACCACGCCTCCCGTGCTGG
ACTCCGACGGCTCCTTCTTCCTCTACAGCAAGCTCACCGTGGACAAGAGCA
GGTGGCAGCAGGGGAACGTCTTCTCATGCTCCGTGATGCATGAGGCTCTGC
ACAACCACTACACGCAGAAGAGCCTCTCCCTGTCTCCGGGTAAATGAGTGC
GACGGCCGCGACTCTAGAGGAT (SEQ ID NO:1)

Example 10: Production of an Antibody from a Polypeptide

The antibodies of the present invention can be prepared by a variety of methods. (See, Current Protocols, Chapter 2.) For example, cells expressing a polypeptide of the present invention is administered to an animal to induce the production of sera containing polyclonal antibodies. In a preferred method, a preparation of the secreted protein is prepared and purified to render it substantially free of natural contaminants. Such a preparation is then introduced into an animal in order to produce polyclonal antisera of greater specific activity.

In the most preferred method, the antibodies of the present invention are monoclonal antibodies (or protein binding fragments thereof). Such monoclonal antibodies can be prepared using hybridoma technology. (Köhler et al., Nature 256:495 (1975); Köhler et al., Eur. J. Immunol. 6:511 (1976); Köhler et al., Eur. J. Immunol. 6:292 (1976); Hammerling et al., in: Monoclonal Antibodies and T-Cell Hybridomas, Elsevier, N.Y., pp. 563-681 (1981).) In general, such procedures involve immunizing an animal (preferably a mouse) with polypeptide or, more preferably, with a secreted polypeptide-expressing cell. Such cells may be cultured in any suitable tissue culture medium; however, it is preferable to culture cells in Earle's modified Eagle's medium supplemented with 10% fetal bovine serum (inactivated at about 56°C), and supplemented with about 10 g/l of nonessential amino acids, about 1,000 U/ml of penicillin, and about 100 µg/ml of streptomycin.

The splenocytes of such mice are extracted and fused with a suitable myeloma cell line. Any suitable myeloma cell line may be employed in accordance with the present invention; however, it is preferable to employ the parent myeloma cell line (SP2O), available from the ATCC. After fusion, the resulting hybridoma cells are selectively maintained in HAT medium, and then cloned by limiting dilution as

described by Wands et al. (Gastroenterology 80:225-232 (1981).) The hybridoma cells obtained through such a selection are then assayed to identify clones which secrete antibodies capable of binding the polypeptide.

Alternatively, additional antibodies capable of binding to the polypeptide can be produced in a two-step procedure using anti-idiotypic antibodies. Such a method makes use of the fact that antibodies are themselves antigens, and therefore, it is possible to obtain an antibody which binds to a second antibody. In accordance with this method, protein specific antibodies are used to immunize an animal, preferably a mouse. The splenocytes of such an animal are then used to produce hybridoma cells, and the hybridoma cells are screened to identify clones which produce an antibody whose ability to bind to the protein-specific antibody can be blocked by the polypeptide. Such antibodies comprise anti-idiotypic antibodies to the protein-specific antibody and can be used to immunize an animal to induce formation of further protein-specific antibodies.

It will be appreciated that Fab and F(ab')2 and other fragments of the antibodies of the present invention may be used according to the methods disclosed herein. Such fragments are typically produced by proteolytic cleavage, using enzymes such as papain (to produce Fab fragments) or pepsin (to produce F(ab')2 fragments). Alternatively, secreted protein-binding fragments can be produced through the application of recombinant DNA technology or through synthetic chemistry.

For in vivo use of antibodies in humans, it may be preferable to use "humanized" chimeric monoclonal antibodies. Such antibodies can be produced using genetic constructs derived from hybridoma cells producing the monoclonal antibodies described above. Methods for producing chimeric antibodies are known in the art. (See, for review, Morrison, Science 229:1202 (1985); Oi et al., BioTechniques 4:214 (1986); Cabilly et al., U.S. Patent No. 4,816,567; Taniguchi et al., EP 171496; Morrison et al., EP 173494; Neuberger et al., WO 8601533;, Robinson et al., WO 8702671; Boulianne et al., Nature 312:643 (1984); Neuberger et al., Nature 314:268 (1985).)

Example 11: Production Of Secreted Protein For High-Throughput Screening Assays

The following protocol produces a supernatant containing a polypeptide to be tested. This supernatant can then be used in the Screening Assays described in Examples 13-20.

First, dilute Poly-D-Lysine (644 587 Boehringer-Mannheim) stock solution (1mg/ml in PBS) 1:20 in PBS (w/o calcium or magnesium 17-516F Biowhittaker) for a

working solution of 50ug/ml. Add 200 ul of this solution to each well (24 well plates) and incubate at RT for 20 minutes. Be sure to distribute the solution over each well (note: a 12-channel pipetter may be used with tips on every other channel). Aspirate off the Poly-D-Lysine solution and rinse with 1ml PBS (Phosphate Buffered Saline). The PBS should remain in the well until just prior to plating the cells and plates may be poly-lysine coated in advance for up to two weeks.

Plate 293T cells (do not carry cells past P+20) at 2 x 10^5 cells/well in .5ml DMEM(Dulbecco's Modified Eagle Medium)(with 4.5 G/L glucose and L-glutamine (12-604F Biowhittaker))/10% heat inactivated FBS(14-503F Biowhittaker)/1x Penstrep(17-602E Biowhittaker). Let the cells grow overnight.

The next day, mix together in a sterile solution basin: 300 ul Lipofectamine (18324-012 Gibco/BRL) and 5ml Optimem I (31985070 Gibco/BRL)/96-well plate. With a small volume multi-channel pipetter, aliquot approximately 2ug of an expression vector containing a polynucleotide insert, produced by the methods described in Examples 8 or 9, into an appropriately labeled 96-well round bottom plate. With a multi-channel pipetter, add 50ul of the Lipofectamine/Optimem I mixture to each well. Pipette up and down gently to mix. Incubate at RT 15-45 minutes. After about 20 minutes, use a multi-channel pipetter to add 150ul Optimem I to each well. As a control, one plate of vector DNA lacking an insert should be transfected with each set of transfections.

Preferably, the transfection should be performed by tag-teaming the following tasks. By tag-teaming, hands on time is cut in half, and the cells do not spend too much time on PBS. First, person A aspirates off the media from four 24-well plates of cells, and then person B rinses each well with .5-1ml PBS. Person A then aspirates off PBS rinse, and person B, using a12-channel pipetter with tips on every other channel, adds the 200ul of DNA/Lipofectamine/Optimem I complex to the odd wells first, then to the even wells, to each row on the 24-well plates. Incubate at 37°C for 6 hours.

While cells are incubating, prepare appropriate media, either 1%BSA in DMEM with 1x penstrep, or CHO-5 media (116.6 mg/L of CaCl2 (anhyd); 0.00130 mg/L $CuSO_4$-$5H_2O$; 0.050 mg/L of $Fe(NO_3)_3$-$9H_2O$; 0.417 mg/L of $FeSO_4$-$7H_2O$; 311.80 mg/L of Kcl; 28.64 mg/L of $MgCl_2$; 48.84 mg/L of $MgSO_4$; 6995.50 mg/L of NaCl; 2400.0 mg/L of $NaHCO_3$; 62.50 mg/L of NaH_2PO_4-H_20; 71.02 mg/L of Na_2HPO4; .4320 mg/L of $ZnSO_4$-$7H_2O$; .002 mg/L of Arachidonic Acid ; 1.022 mg/L of Cholesterol; .070 mg/L of DL-alpha-Tocopherol-Acetate; 0.0520 mg/L of Linoleic Acid; 0.010 mg/L of Linolenic Acid; 0.010 mg/L of Myristic Acid; 0.010 mg/L of Oleic Acid; 0.010 mg/L of Palmitric Acid; 0.010 mg/L of Palmitic Acid; 100 mg/L of

Pluronic F-68; 0.010 mg/L of Stearic Acid; 2.20 mg/L of Tween 80; 4551 mg/L of D-Glucose; 130.85 mg/ml of L- Alanine; 147.50 mg/ml of L-Arginine-HCL; 7.50 mg/ml of L-Asparagine-H_20; 6.65 mg/ml of L-Aspartic Acid; 29.56 mg/ml of L-Cystine-2HCL-H_20; 31.29 mg/ml of L-Cystine-2HCL; 7.35 mg/ml of L-Glutamic Acid; 365.0 mg/ml of L-Glutamine; 18.75 mg/ml of Glycine; 52.48 mg/ml of L-Histidine-HCL-H_20; 106.97 mg/ml of L-Isoleucine; 111.45 mg/ml of L-Leucine; 163.75 mg/ml of L-Lysine HCL; 32.34 mg/ml of L-Methionine; 68.48 mg/ml of L-Phenylalainine; 40.0 mg/ml of L-Proline; 26.25 mg/ml of L-Serine; 101.05 mg/ml of L-Threonine; 19.22 mg/ml of L-Tryptophan; 91.79 mg/ml of L-Tryrosine-2Na-$2H_20$; 99.65 mg/ml of L-Valine; 0.0035 mg/L of Biotin; 3.24 mg/L of D-Ca Pantothenate; 11.78 mg/L of Choline Chloride; 4.65 mg/L of Folic Acid; 15.60 mg/L of i-Inositol; 3.02 mg/L of Niacinamide; 3.00 mg/L of Pyridoxal HCL; 0.031 mg/L of Pyridoxine HCL; 0.319 mg/L of Riboflavin; 3.17 mg/L of Thiamine HCL; 0.365 mg/L of Thymidine; and 0.680 mg/L of Vitamin B_{12}; 25 mM of HEPES Buffer; 2.39 mg/L of Na Hypoxanthine; 0.105 mg/L of Lipoic Acid; 0.081 mg/L of Sodium Putrescine-2HCL; 55.0 mg/L of Sodium Pyruvate; 0.0067 mg/L of Sodium Selenite; 20uM of Ethanolamine; 0.122 mg/L of Ferric Citrate; 41.70 mg/L of Methyl-B-Cyclodextrin complexed with Linoleic Acid; 33.33 mg/L of Methyl-B-Cyclodextrin complexed with Oleic Acid; and 10 mg/L of Methyl-B-Cyclodextrin complexed with Retinal) with 2mm glutamine and 1x penstrep. (BSA (81-068-3 Bayer) 100gm dissolved in 1L DMEM for a 10% BSA stock solution). Filter the media and collect 50 ul for endotoxin assay in 15ml polystyrene conical.

The transfection reaction is terminated, preferably by tag-teaming, at the end of the incubation period. Person A aspirates off the transfection media, while person B adds 1.5ml appropriate media to each well. Incubate at 37°C for 45 or 72 hours depending on the media used: 1%BSA for 45 hours or CHO-5 for 72 hours.

On day four, using a 300ul multichannel pipetter, aliquot 600ul in one 1ml deep well plate and the remaining supernatant into a 2ml deep well. The supernatants from each well can then be used in the assays described in Examples 13-20.

It is specifically understood that when activity is obtained in any of the assays described below using a supernatant, the activity originates from either the polypeptide directly (e.g., as a secreted protein) or by the polypeptide inducing expression of other proteins, which are then secreted into the supernatant. Thus, the invention further provides a method of identifying the protein in the supernatant characterized by an activity in a particular assay.

Example 12: Construction of GAS Reporter Construct

One signal transduction pathway involved in the differentiation and proliferation of cells is called the Jaks-STATs pathway. Activated proteins in the Jaks-STATs pathway bind to gamma activation site "GAS" elements or interferon-sensitive responsive element ("ISRE"), located in the promoter of many genes. The binding of a protein to these elements alter the expression of the associated gene.

GAS and ISRE elements are recognized by a class of transcription factors called Signal Transducers and Activators of Transcription, or "STATs." There are six members of the STATs family. Stat1 and Stat3 are present in many cell types, as is Stat2 (as response to IFN-alpha is widespread). Stat4 is more restricted and is not in many cell types though it has been found in T helper class I, cells after treatment with IL-12. Stat5 was originally called mammary growth factor, but has been found at higher concentrations in other cells including myeloid cells. It can be activated in tissue culture cells by many cytokines.

The STATs are activated to translocate from the cytoplasm to the nucleus upon tyrosine phosphorylation by a set of kinases known as the Janus Kinase ("Jaks") family. Jaks represent a distinct family of soluble tyrosine kinases and include Tyk2, Jak1, Jak2, and Jak3. These kinases display significant sequence similarity and are generally catalytically inactive in resting cells.

The Jaks are activated by a wide range of receptors summarized in the Table below. (Adapted from review by Schidler and Darnell, Ann. Rev. Biochem. 64:621-51 (1995).) A cytokine receptor family, capable of activating Jaks, is divided into two groups: (a) Class 1 includes receptors for IL-2, IL-3, IL-4, IL-6, IL-7, IL-9, IL-11, IL-12, IL-15, Epo, PRL, GH, G-CSF, GM-CSF, LIF, CNTF, and thrombopoietin; and (b) Class 2 includes IFN-a, IFN-g, and IL-10. The Class 1 receptors share a conserved cysteine motif (a set of four conserved cysteines and one tryptophan) and a WSXWS motif (a membrane proxial region encoding Trp-Ser-Xxx-Trp-Ser (SEQ ID NO:2)).

Thus, on binding of a ligand to a receptor, Jaks are activated, which in turn activate STATs, which then translocate and bind to GAS elements. This entire process is encompassed in the Jaks-STATs signal transduction pathway.

Therefore, activation of the Jaks-STATs pathway, reflected by the binding of the GAS or the ISRE element, can be used to indicate proteins involved in the proliferation and differentiation of cells. For example, growth factors and cytokines are known to activate the Jaks-STATs pathway. (See Table below.) Thus, by using GAS elements linked to reporter molecules, activators of the Jaks-STATs pathway can be identified.

Ligand	JAKs tvk2	Jak1	Jak2	Jak3	STATS	GAS(elements) or ISRE
IFN family						
IFN-a/B	+	+	-	-	1,2,3	ISRE
IFN-g		+	+	-	1	GAS (IRF1>Lys6>IFP)
Il-10	+	?	?	-	1,3	
gp130 family						
IL-6 (Pleiotrohic)	+	+	+	?	1,3	GAS (IRF1>Lys6>IFP)
Il-11(Pleiotrohic)	?	+	?	?	1,3	
OnM(Pleiotrohic)	?	+	+	?	1,3	
LIF(Pleiotrohic)	?	+	+	?	1,3	
CNTF(Pleiotrohic)	-/+	+	+	?	1,3	
G-CSF(Pleiotrohic)	?	+	?	?	1,3	
IL-12(Pleiotrohic)	+	-	+	+	1,3	
g-C family						
IL-2 (lymphocytes)	-	+	-	+	1,3,5	GAS
IL-4 (lymph/myeloid)	-	+	-	+	6	GAS (IRF1 = IFP >>Ly6)(IgH)
IL-7 (lymphocytes)	-	+	-	+	5	GAS
IL-9 (lymphocytes)	-	+	-	+	5	GAS
IL-13 (lymphocyte)	-	+	?	?	6	GAS
IL-15	?	+	?	+	5	GAS
gp140 family						
IL-3 (myeloid)	-	-	+	-	5	GAS (IRF1>IFP>>Ly6)
IL-5 (myeloid)	-	-	+	-	5	GAS
GM-CSF (myeloid)	-	-	+	-	5	GAS
Growth hormone family						
GH	?	-	+	-	5	
PRL	?	+/-	+	-	1,3,5	
EPO	?	-	+	-	5	GAS(B-CAS>IRF1=IFP>>Ly6)
Receptor Tyrosine Kinases						
EGF	?	+	+	-	1,3	GAS (IRF1)
PDGF	?	+	+	-	1,3	
CSF-1	?	+	+	-	1,3	GAS (not IRF1)

To construct a synthetic GAS containing promoter element, which is used in the Biological Assays described in Examples 13-14, a PCR based strategy is employed to generate a GAS-SV40 promoter sequence. The 5' primer contains four tandem copies of the GAS binding site found in the IRF1 promoter and previously demonstrated to bind STATs upon induction with a range of cytokines (Rothman et al., Immunity 1:457-468 (1994).), although other GAS or ISRE elements can be used instead. The 5' primer also contains 18bp of sequence complementary to the SV40 early promoter sequence and is flanked with an XhoI site. The sequence of the 5' primer is: 5':GCGCCTCGAGATTTCCCCGAAATCTAGATTTCCCCGAAATGATTTCCCCG AAATGATTTCCCCGAAATATCTGCCATCTCAATTAG:3' (SEQ ID NO:3)

The downstream primer is complementary to the SV40 promoter and is flanked with a Hind III site: 5':GCGGCAAGCTTTTTGCAAAGCCTAGGC:3' (SEQ ID NO:4).

PCR amplification is performed using the SV40 promoter template present in the B-gal:promoter plasmid obtained from Clontech. The resulting PCR fragment is digested with XhoI/Hind III and subcloned into BLSK2-. (Stratagene.) Sequencing with forward and reverse primers confirms that the insert contains the following sequence:

5':<u>CTCGAG</u>ATTTCCCCGAAATCTAGATTTCCCCGAAATGATTTCCCCGAAATG ATTTCCCCGAAATATCTGCCATCTCAATTAGTCAGCAACCATAGTCCCGCCC CTAACTCCGCCCATCCCGCCCCTAACTCCGCCCAGTTCCGCCCATTCTCCGC CCCATGGCTGACTAATTTTTTTTATTTATGCAGAGGCCGAGGCCGCCTCGGC CTCTGAGCTATTCCAGAAGTAGTGAGGAGGCTTTTTTGGAGGCCTAGGCTTT TGCAAA<u>AAGCTT</u>:3' (SEQ ID NO:5)

With this GAS promoter element linked to the SV40 promoter, a GAS:SEAP2 reporter construct is next engineered. Here, the reporter molecule is a secreted alkaline phosphatase, or "SEAP." Clearly, however, any reporter molecule can be instead of SEAP, in this or in any of the other Examples. Well known reporter molecules that can be used instead of SEAP include chloramphenicol acetyltransferase (CAT), luciferase, alkaline phosphatase, B-galactosidase, green fluorescent protein (GFP), or any protein detectable by an antibody.

The above sequence confirmed synthetic GAS-SV40 promoter element is subcloned into the pSEAP-Promoter vector obtained from Clontech using HindIII and XhoI, effectively replacing the SV40 promoter with the amplified GAS:SV40 promoter element, to create the GAS-SEAP vector. However, this vector does not contain a neomycin resistance gene, and therefore, is not preferred for mammalian expression systems.

Thus, in order to generate mammalian stable cell lines expressing the GAS-SEAP reporter, the GAS-SEAP cassette is removed from the GAS-SEAP vector using SalI and NotI, and inserted into a backbone vector containing the neomycin resistance gene, such as pGFP-1 (Clontech), using these restriction sites in the multiple cloning site, to create the GAS-SEAP/Neo vector. Once this vector is transfected into mammalian cells, this vector can then be used as a reporter molecule for GAS binding as described in Examples 13-14.

Other constructs can be made using the above description and replacing GAS with a different promoter sequence. For example, construction of reporter molecules containing NFK-B and EGR promoter sequences are described in Examples 15 and 16. However, many other promoters can be substituted using the protocols described in these Examples. For instance, SRE, IL-2, NFAT, or Osteocalcin promoters can be substituted, alone or in combination (e.g., GAS/NF-KB/EGR, GAS/NF-KB, Il-2/NFAT, or NF-KB/GAS). Similarly, other cell lines can be used to test reporter construct activity, such as HELA (epithelial), HUVEC (endothelial), Reh (B-cell), Saos-2 (osteoblast), HUVAC (aortic), or Cardiomyocyte.

Example 13: High-Throughput Screening Assay for T-cell Activity.

The following protocol is used to assess T-cell activity by identifying factors, such as growth factors and cytokines, that may proliferate or differentiate T-cells. T-cell activity is assessed using the GAS/SEAP/Neo construct produced in Example 12. Thus, factors that increase SEAP activity indicate the ability to activate the Jaks-STATS signal transduction pathway. The T-cell used in this assay is Jurkat T-cells (ATCC Accession No. TIB-152), although Molt-3 cells (ATCC Accession No. CRL-1552) and Molt-4 cells (ATCC Accession No. CRL-1582) cells can also be used.

Jurkat T-cells are lymphoblastic CD4+ Th1 helper cells. In order to generate stable cell lines, approximately 2 million Jurkat cells are transfected with the GAS-SEAP/neo vector using DMRIE-C (Life Technologies)(transfection procedure described below). The transfected cells are seeded to a density of approximately 20,000 cells per well and transfectants resistant to 1 mg/ml genticin selected. Resistant colonies are expanded and then tested for their response to increasing concentrations of interferon gamma. The dose response of a selected clone is demonstrated.

Specifically, the following protocol will yield sufficient cells for 75 wells containing 200 ul of cells. Thus, it is either scaled up, or performed in multiple to generate sufficient cells for multiple 96 well plates. Jurkat cells are maintained in RPMI + 10% serum with 1%Pen-Strep. Combine 2.5 mls of OPTI-MEM (Life Technologies)

with 10 ug of plasmid DNA in a T25 flask. Add 2.5 ml OPTI-MEM containing 50 ul of DMRIE-C and incubate at room temperature for 15-45 mins.

During the incubation period, count cell concentration, spin down the required number of cells (10^7 per transfection), and resuspend in OPTI-MEM to a final concentration of 10^7 cells/ml. Then add 1ml of 1×10^7 cells in OPTI-MEM to T25 flask and incubate at 37°C for 6 hrs. After the incubation, add 10 ml of RPMI + 15% serum.

The Jurkat:GAS-SEAP stable reporter lines are maintained in RPMI + 10% serum, 1 mg/ml Genticin, and 1% Pen-Strep. These cells are treated with supernatants containing a polypeptide as produced by the protocol described in Example 11.

On the day of treatment with the supernatant, the cells should be washed and resuspended in fresh RPMI + 10% serum to a density of 500,000 cells per ml. The exact number of cells required will depend on the number of supernatants being screened. For one 96 well plate, approximately 10 million cells (for 10 plates, 100 million cells) are required.

Transfer the cells to a triangular reservoir boat, in order to dispense the cells into a 96 well dish, using a 12 channel pipette. Using a 12 channel pipette, transfer 200 ul of cells into each well (therefore adding 100, 000 cells per well).

After all the plates have been seeded, 50 ul of the supernatants are transferred directly from the 96 well plate containing the supernatants into each well using a 12 channel pipette.. In addition, a dose of exogenous interferon gamma (0.1, 1.0, 10 ng) is added to wells H9, H10, and H11 to serve as additional positive controls for the assay.

The 96 well dishes containing Jurkat cells treated with supernatants are placed in an incubator for 48 hrs (note: this time is variable between 48-72 hrs). 35 ul samples from each well are then transferred to an opaque 96 well plate using a 12 channel pipette. The opaque plates should be covered (using sellophene covers) and stored at -20°C until SEAP assays are performed according to Example 17. The plates containing the remaining treated cells are placed at 4°C and serve as a source of material for repeating the assay on a specific well if desired.

As a positive control, 100 Unit/ml interferon gamma can be used which is known to activate Jurkat T cells. Over 30 fold induction is typically observed in the positive control wells.

Example 14: High-Throughput Screening Assay Identifying Myeloid Activity

The following protocol is used to assess myeloid activity by identifying factors, such as growth factors and cytokines, that may proliferate or differentiate myeloid cells. Myeloid cell activity is assessed using the GAS/SEAP/Neo construct produced in Example 12. Thus, factors that increase SEAP activity indicate the ability to activate the Jaks-STATS signal transduction pathway. The myeloid cell used in this assay is U937, a pre-monocyte cell line, although TF-1, HL60, or KG1 can be used.

To transiently transfect U937 cells with the GAS/SEAP/Neo construct produced in Example 12, a DEAE-Dextran method (Kharbanda et. al., 1994, Cell Growth & Differentiation, 5:259-265) is used. First, harvest $2x10e^7$ U937 cells and wash with PBS. The U937 cells are usually grown in RPMI 1640 medium containing 10% heat-inactivated fetal bovine serum (FBS) supplemented with 100 units/ml penicillin and 100 mg/ml streptomycin.

Next, suspend the cells in 1 ml of 20 mM Tris-HCl (pH 7.4) buffer containing 0.5 mg/ml DEAE-Dextran, 8 ug GAS-SEAP2 plasmid DNA, 140 mM NaCl, 5 mM KCl, 375 uM $Na_2HPO_4.7H_2O$, 1 mM $MgCl_2$, and 675 uM $CaCl_2$. Incubate at 37°C for 45 min.

Wash the cells with RPMI 1640 medium containing 10% FBS and then resuspend in 10 ml complete medium and incubate at 37°C for 36 hr.

The GAS-SEAP/U937 stable cells are obtained by growing the cells in 400 ug/ml G418. The G418-free medium is used for routine growth but every one to two months, the cells should be re-grown in 400 ug/ml G418 for couple of passages.

These cells are tested by harvesting $1x10^8$ cells (this is enough for ten 96-well plates assay) and wash with PBS. Suspend the cells in 200 ml above described growth medium, with a final density of $5x10^5$ cells/ml. Plate 200 ul cells per well in the 96-well plate (or $1x10^5$ cells/well).

Add 50 ul of the supernatant prepared by the protocol described in Example 11. Incubate at 37°C for 48 to 72 hr. As a positive control, 100 Unit/ml interferon gamma can be used which is known to activate U937 cells. Over 30 fold induction is typically observed in the positive control wells. SEAP assay the supernatant according to the protocol described in Example 17.

Example 15: High-Throughput Screening Assay Identifying Neuronal Activity.

When cells undergo differentiation and proliferation, a group of genes are activated through many different signal transduction pathways. One of these genes, EGR1 (early growth response gene 1), is induced in various tissues and cell types upon activation. The promoter of EGR1 is responsible for such induction. Using the EGR1 promoter linked to reporter molecules, activation of cells can be assessed.

Particularly, the following protocol is used to assess neuronal activity in PC12 cell lines. PC12 cells (rat phenochromocytoma cells) are known to proliferate and/or differentiate by activation with a number of mitogens, such as TPA (tetradecanoyl phorbol acetate), NGF (nerve growth factor), and EGF (epidermal growth factor). The EGR1 gene expression is activated during this treatment. Thus, by stably transfecting PC12 cells with a construct containing an EGR promoter linked to SEAP reporter, activation of PC12 cells can be assessed.

The EGR/SEAP reporter construct can be assembled by the following protocol. The EGR-1 promoter sequence (-633 to +1)(Sakamoto K et al., Oncogene 6:867-871 (1991)) can be PCR amplified from human genomic DNA using the following primers:

5' GCGCTCGAGGGATGACAGCGATAGAACCCCGG -3' (SEQ ID NO:6)

5' GCGAAGCTTCGCGACTCCCCGGATCCGCCTC-3' (SEQ ID NO:7)

Using the GAS:SEAP/Neo vector produced in Example 12, EGR1 amplified product can then be inserted into this vector. Linearize the GAS:SEAP/Neo vector using restriction enzymes XhoI/HindIII, removing the GAS/SV40 stuffer. Restrict the EGR1 amplified product with these same enzymes. Ligate the vector and the EGR1 promoter.

To prepare 96 well-plates for cell culture, two mls of a coating solution (1:30 dilution of collagen type I (Upstate Biotech Inc. Cat#08-115) in 30% ethanol (filter sterilized)) is added per one 10 cm plate or 50 ml per well of the 96-well plate, and allowed to air dry for 2 hr.

PC12 cells are routinely grown in RPMI-1640 medium (Bio Whittaker) containing 10% horse serum (JRH BIOSCIENCES, Cat. # 12449-78P), 5% heat-inactivated fetal bovine serum (FBS) supplemented with 100 units/ml penicillin and 100 ug/ml streptomycin on a precoated 10 cm tissue culture dish. One to four split is done every three to four days. Cells are removed from the plates by scraping and resuspended with pipetting up and down for more than 15 times.

Transfect the EGR/SEAP/Neo construct into PC12 using the Lipofectamine protocol described in Example 11. EGR-SEAP/PC12 stable cells are obtained by growing the cells in 300 ug/ml G418. The G418-free medium is used for routine

growth but every one to two months, the cells should be re-grown in 300 ug/ml G418 for couple of passages.

To assay for neuronal activity, a 10 cm plate with cells around 70 to 80% confluent is screened by removing the old medium. Wash the cells once with PBS (Phosphate buffered saline). Then starve the cells in low serum medium (RPMI-1640 containing 1% horse serum and 0.5% FBS with antibiotics) overnight.

The next morning, remove the medium and wash the cells with PBS. Scrape off the cells from the plate, suspend the cells well in 2 ml low serum medium. Count the cell number and add more low serum medium to reach final cell density as 5×10^5 cells/ml.

Add 200 ul of the cell suspension to each well of 96-well plate (equivalent to 1×10^5 cells/well). Add 50 ul supernatant produced by Example 11, 37°C for 48 to 72 hr. As a positive control, a growth factor known to activate PC12 cells through EGR can be used, such as 50 ng/ul of Neuronal Growth Factor (NGF). Over fifty-fold induction of SEAP is typically seen in the positive control wells. SEAP assay the supernatant according to Example 17.

Example 16: High-Throughput Screening Assay for T-cell Activity

NF-κB (Nuclear Factor κB) is a transcription factor activated by a wide variety of agents including the inflammatory cytokines IL-1 and TNF, CD30 and CD40, lymphotoxin-alpha and lymphotoxin-beta, by exposure to LPS or thrombin, and by expression of certain viral gene products. As a transcription factor, NF-κB regulates the expression of genes involved in immune cell activation, control of apoptosis (NF-κB appears to shield cells from apoptosis), B and T-cell development, anti-viral and antimicrobial responses, and multiple stress responses.

In non-stimulated conditions, NF- κB is retained in the cytoplasm with I-κB (Inhibitor κB). However, upon stimulation, I- κB is phosphorylated and degraded, causing NF- κB to shuttle to the nucleus, thereby activating transcription of target genes. Target genes activated by NF- κB include IL-2, IL-6, GM-CSF, ICAM-1 and class 1 MHC.

Due to its central role and ability to respond to a range of stimuli, reporter constructs utilizing the NF-κB promoter element are used to screen the supernatants produced in Example 11. Activators or inhibitors of NF-kB would be useful in treating

diseases. For example, inhibitors of NF-κB could be used to treat those diseases related to the acute or chronic activation of NF-κB, such as rheumatoid arthritis.

To construct a vector containing the NF-κB promoter element, a PCR based strategy is employed. The upstream primer contains four tandem copies of the NF-κB binding site (GGGGACTTTCCC) (SEQ ID NO:8), 18 bp of sequence complementary to the 5' end of the SV40 early promoter sequence, and is flanked with an XhoI site:
5':GCGGCCTCGAGGGGACTTTCCCGGGGACTTTCCGGGGACTTTCCGGGAC
TTTCCATCCTGCCATCTCAATTAG:3' (SEQ ID NO:9)

The downstream primer is complementary to the 3' end of the SV40 promoter and is flanked with a Hind III site:
5':GCGGCAAGCTTTTTGCAAAGCCTAGGC:3' (SEQ ID NO:4)

PCR amplification is performed using the SV40 promoter template present in the pB-gal:promoter plasmid obtained from Clontech. The resulting PCR fragment is digested with XhoI and Hind III and subcloned into BLSK2-. (Stratagene) Sequencing with the T7 and T3 primers confirms the insert contains the following sequence:

5':CTCGAGGGGACTTTCCCGGGGACTTTCCGGGGACTTTCCGGGACTTTCC
ATCTGCCATCTCAATTAGTCAGCAACCATAGTCCCGCCCCTAACTCCGCCCA
TCCCGCCCCTAACTCCGCCCAGTTCCGCCCATTCTCCGCCCCATGGCTGACT
AATTTTTTTTATTTATGCAGAGGCCGAGGCCGCCTCGGCCTCTGAGCTATTC
CAGAAGTAGTGAGGAGGCTTTTTTGGAGGCCTAGGCTTTTGCAAAAAGCTT:
3' (SEQ ID NO:10)

Next, replace the SV40 minimal promoter element present in the pSEAP2-promoter plasmid (Clontech) with this NF-κB/SV40 fragment using XhoI and HindIII. However, this vector does not contain a neomycin resistance gene, and therefore, is not preferred for mammalian expression systems.

In order to generate stable mammalian cell lines, the NF-κB/SV40/SEAP cassette is removed from the above NF-κB/SEAP vector using restriction enzymes SalI and NotI, and inserted into a vector containing neomycin resistance. Particularly, the NF-κB/SV40/SEAP cassette was inserted into pGFP-1 (Clontech), replacing the GFP gene, after restricting pGFP-1 with SalI and NotI.

Once NF-κB/SV40/SEAP/Neo vector is created, stable Jurkat T-cells are created and maintained according to the protocol described in Example 13. Similarly, the method for assaying supernatants with these stable Jurkat T-cells is also described in Example 13. As a positive control, exogenous TNF alpha (0.1,1, 10 ng) is added to wells H9, H10, and H11, with a 5-10 fold activation typically observed.

Example 17: Assay for SEAP Activity

As a reporter molecule for the assays described in Examples 13-16, SEAP activity is assayed using the Tropix Phospho-light Kit (Cat. BP-400) according to the following general procedure. The Tropix Phospho-light Kit supplies the Dilution, Assay, and Reaction Buffers used below.

Prime a dispenser with the 2.5x Dilution Buffer and dispense 15 µl of 2.5x dilution buffer into Optiplates containing 35 µl of a supernatant. Seal the plates with a plastic sealer and incubate at 65°C for 30 min. Separate the Optiplates to avoid uneven heating.

Cool the samples to room temperature for 15 minutes. Empty the dispenser and prime with the Assay Buffer. Add 50 µl Assay Buffer and incubate at room temperature 5 min. Empty the dispenser and prime with the Reaction Buffer (see the table below). Add 50 µl Reaction Buffer and incubate at room temperature for 20 minutes. Since the intensity of the chemiluminescent signal is time dependent, and it takes about 10 minutes to read 5 plates on luminometer, one should treat 5 plates at each time and start the second set 10 minutes later.

Read the relative light unit in the luminometer. Set H12 as blank, and print the results. An increase in chemiluminescence indicates reporter activity.

Reaction Buffer Formulation:

# of plates	Rxn buffer diluent (ml)	CSPD (ml)
10	60	3
11	65	3.25
12	70	3.5
13	75	3.75
14	80	4
15	85	4.25
16	90	4.5
17	95	4.75
18	100	5
19	105	5.25
20	110	5.5
21	115	5.75
22	120	6

23	125	6.25
24	130	6.5
25	135	6.75
26	140	7
27	145	7.25
28	150	7.5
29	155	7.75
30	160	8
31	165	8.25
32	170	8.5
33	175	8.75
34	180	9
35	185	9.25
36	190	9.5
37	195	9.75
38	200	10
39	205	10.25
40	210	10.5
41	215	10.75
42	220	11
43	225	11.25
44	230	11.5
45	235	11.75
46	240	12
47	245	12.25
48	250	12.5
49	255	12.75
50	260	13

Example 18: High-Throughput Screening Assay Identifying Changes in Small Molecule Concentration and Membrane Permeability

Binding of a ligand to a receptor is known to alter intracellular levels of small molecules, such as calcium, potassium, sodium, and pH, as well as alter membrane potential. These alterations can be measured in an assay to identify supernatants which bind to receptors of a particular cell. Although the following protocol describes an assay for calcium, this protocol can easily be modified to detect changes in potassium, sodium, pH, membrane potential, or any other small molecule which is detectable by a fluorescent probe.

The following assay uses Fluorometric Imaging Plate Reader ("FLIPR") to measure changes in fluorescent molecules (Molecular Probes) that bind small molecules. Clearly, any fluorescent molecule detecting a small molecule can be used instead of the calcium fluorescent molecule, fluo-3, used here.

For adherent cells, seed the cells at 10,000 -20,000 cells/well in a Co-star black 96-well plate with clear bottom. The plate is incubated in a CO_2 incubator for 20 hours. The adherent cells are washed two times in Biotek washer with 200 ul of HBSS (Hank's Balanced Salt Solution) leaving 100 ul of buffer after the final wash.

A stock solution of 1 mg/ml fluo-3 is made in 10% pluronic acid DMSO. To load the cells with fluo-3, 50 ul of 12 ug/ml fluo-3 is added to each well. The plate is incubated at 37°C in a CO_2 incubator for 60 min. The plate is washed four times in the Biotek washer with HBSS leaving 100 ul of buffer.

For non-adherent cells, the cells are spun down from culture media. Cells are re-suspended to 2-5x10^6 cells/ml with HBSS in a 50-ml conical tube. 4 ul of 1 mg/ml fluo-3 solution in 10% pluronic acid DMSO is added to each ml of cell suspension. The tube is then placed in a 37°C water bath for 30-60 min. The cells are washed twice with HBSS, resuspended to 1x10^6 cells/ml, and dispensed into a microplate, 100 ul/well. The plate is centrifuged at 1000 rpm for 5 min. The plate is then washed once in Denley CellWash with 200 ul, followed by an aspiration step to 100 ul final volume.

For a non-cell based assay, each well contains a fluorescent molecule, such as fluo-3. The supernatant is added to the well, and a change in fluorescence is detected.

To measure the fluorescence of intracellular calcium, the FLIPR is set for the following parameters: (1) System gain is 300-800 mW; (2) Exposure time is 0.4 second; (3) Camera F/stop is F/2; (4) Excitation is 488 nm; (5) Emission is 530 nm; and (6) Sample addition is 50 ul. Increased emission at 530 nm indicates an extracellular signaling event which has resulted in an increase in the intracellular Ca^{++} concentration.

Example 19: High-Throughput Screening Assay Identifying Tyrosine Kinase Activity

The Protein Tyrosine Kinases (PTK) represent a diverse group of transmembrane and cytoplasmic kinases. Within the Receptor Protein Tyrosine Kinase RPTK) group are receptors for a range of mitogenic and metabolic growth factors including the PDGF, FGF, EGF, NGF, HGF and Insulin receptor subfamilies. In addition there are a large family of RPTKs for which the corresponding ligand is unknown. Ligands for RPTKs include mainly secreted small proteins, but also membrane-bound and extracellular matrix proteins.

Activation of RPTK by ligands involves ligand-mediated receptor dimerization, resulting in transphosphorylation of the receptor subunits and activation of the cytoplasmic tyrosine kinases. The cytoplasmic tyrosine kinases include receptor associated tyrosine kinases of the src-family (e.g., src, yes, lck, lyn, fyn) and non-receptor linked and cytosolic protein tyrosine kinases, such as the Jak family, members of which mediate signal transduction triggered by the cytokine superfamily of receptors (e.g., the Interleukins, Interferons, GM-CSF, and Leptin).

Because of the wide range of known factors capable of stimulating tyrosine kinase activity, the identification of novel human secreted proteins capable of activating tyrosine kinase signal transduction pathways are of interest. Therefore, the following protocol is designed to identify those novel human secreted proteins capable of activating the tyrosine kinase signal transduction pathways.

Seed target cells (e.g., primary keratinocytes) at a density of approximately 25,000 cells per well in a 96 well Loprodyne Silent Screen Plates purchased from Nalge Nunc (Naperville, IL). The plates are sterilized with two 30 minute rinses with 100% ethanol, rinsed with water and dried overnight. Some plates are coated for 2 hr with 100 ml of cell culture grade type I collagen (50 mg/ml), gelatin (2%) or polylysine (50 mg/ml), all of which can be purchased from Sigma Chemicals (St. Louis, MO) or 10% Matrigel purchased from Becton Dickinson (Bedford,MA), or calf serum, rinsed with PBS and stored at 4°C. Cell growth on these plates is assayed by seeding 5,000 cells/well in growth medium and indirect quantitation of cell number through use of alamarBlue as described by the manufacturer Alamar Biosciences, Inc. (Sacramento, CA) after 48 hr. Falcon plate covers #3071 from Becton Dickinson (Bedford,MA) are used to cover the Loprodyne Silent Screen Plates. Falcon Microtest III cell culture plates can also be used in some proliferation experiments.

To prepare extracts, A431 cells are seeded onto the nylon membranes of Loprodyne plates (20,000/200ml/well) and cultured overnight in complete medium. Cells are quiesced by incubation in serum-free basal medium for 24 hr. After 5-20 minutes treatment with EGF (60ng/ml) or 50 ul of the supernatant produced in Example 11, the medium was removed and 100 ml of extraction buffer ((20 mM HEPES pH 7.5, 0.15 M NaCl, 1% Triton X-100, 0.1% SDS, 2 mM Na3VO4, 2 mM Na4P2O7 and a cocktail of protease inhibitors (# 1836170) obtained from Boeheringer Mannheim (Indianapolis, IN) is added to each well and the plate is shaken on a rotating shaker for 5 minutes at 4°C. The plate is then placed in a vacuum transfer manifold and the extract filtered through the 0.45 mm membrane bottoms of each well using house vacuum. Extracts are collected in a 96-well catch/assay plate in the bottom of the vacuum manifold and immediately placed on ice. To obtain extracts clarified by centrifugation, the content of each well, after detergent solubilization for 5 minutes, is removed and centrifuged for 15 minutes at 4°C at 16,000 x g.

Test the filtered extracts for levels of tyrosine kinase activity. Although many methods of detecting tyrosine kinase activity are known, one method is described here.

Generally, the tyrosine kinase activity of a supernatant is evaluated by determining its ability to phosphorylate a tyrosine residue on a specific substrate (a

biotinylated peptide). Biotinylated peptides that can be used for this purpose include PSK1 (corresponding to amino acids 6-20 of the cell division kinase cdc2-p34) and PSK2 (corresponding to amino acids 1-17 of gastrin). Both peptides are substrates for a range of tyrosine kinases and are available from Boehringer Mannheim.

The tyrosine kinase reaction is set up by adding the following components in order. First, add 10ul of 5uM Biotinylated Peptide, then 10ul ATP/Mg_{2+} (5mM ATP/50mM $MgCl_2$), then 10ul of 5x Assay Buffer (40mM imidazole hydrochloride, pH7.3, 40 mM beta-glycerophosphate, 1mM EGTA, 100mM $MgCl_2$, 5 mM $MnCl_2$, 0.5 mg/ml BSA), then 5ul of Sodium Vanadate(1mM), and then 5ul of water. Mix the components gently and preincubate the reaction mix at 30°C for 2 min. Initial the reaction by adding 10ul of the control enzyme or the filtered supernatant.

The tyrosine kinase assay reaction is then terminated by adding 10 ul of 120mm EDTA and place the reactions on ice.

Tyrosine kinase activity is determined by transferring 50 ul aliquot of reaction mixture to a microtiter plate (MTP) module and incubating at 37°C for 20 min. This allows the streptavadin coated 96 well plate to associate with the biotinylated peptide. Wash the MTP module with 300ul/well of PBS four times. Next add 75 ul of anti-phospotyrosine antibody conjugated to horse radish peroxidase(anti-P-Tyr-POD(0.5u/ml)) to each well and incubate at 37°C for one hour. Wash the well as above.

Next add 100ul of peroxidase substrate solution (Boehringer Mannheim) and incubate at room temperature for at least 5 mins (up to 30 min). Measure the absorbance of the sample at 405 nm by using ELISA reader. The level of bound peroxidase activity is quantitated using an ELISA reader and reflects the level of tyrosine kinase activity.

Example 20: High-Throughput Screening Assay Identifying Phosphorylation Activity

As a potential alternative and/or compliment to the assay of protein tyrosine kinase activity described in Example 19, an assay which detects activation (phosphorylation) of major intracellular signal transduction intermediates can also be used. For example, as described below one particular assay can detect tyrosine phosphorylation of the Erk-1 and Erk-2 kinases. However, phosphorylation of other molecules, such as Raf, JNK, p38 MAP, Map kinase kinase (MEK), MEK kinase, Src, Muscle specific kinase (MuSK), IRAK, Tec, and Janus, as well as any other

phosphoserine, phosphotyrosine, or phosphothreonine molecule, can be detected by substituting these molecules for Erk-1 or Erk-2 in the following assay.

Specifically, assay plates are made by coating the wells of a 96-well ELISA plate with 0.1ml of protein G (1ug/ml) for 2 hr at room temp, (RT). The plates are then rinsed with PBS and blocked with 3% BSA/PBS for 1 hr at RT. The protein G plates are then treated with 2 commercial monoclonal antibodies (100ng/well) against Erk-1 and Erk-2 (1 hr at RT) (Santa Cruz Biotechnology). (To detect other molecules, this step can easily be modified by substituting a monoclonal antibody detecting any of the above described molecules.) After 3-5 rinses with PBS, the plates are stored at 4°C until use.

A431 cells are seeded at 20,000/well in a 96-well Loprodyne filterplate and cultured overnight in growth medium. The cells are then starved for 48 hr in basal medium (DMEM) and then treated with EGF (6ng/well) or 50 ul of the supernatants obtained in Example 11 for 5-20 minutes. The cells are then solubilized and extracts filtered directly into the assay plate.

After incubation with the extract for 1 hr at RT, the wells are again rinsed. As a positive control, a commercial preparation of MAP kinase (10ng/well) is used in place of A431 extract. Plates are then treated with a commercial polyclonal (rabbit) antibody (1ug/ml) which specifically recognizes the phosphorylated epitope of the Erk-1 and Erk-2 kinases (1 hr at RT). This antibody is biotinylated by standard procedures. The bound polyclonal antibody is then quantitated by successive incubations with Europium-streptavidin and Europium fluorescence enhancing reagent in the Wallac DELFIA instrument (time-resolved fluorescence). An increased fluorescent signal over background indicates a phosphorylation.

Example 21: Method of Determining Alterations in a Gene Corresponding to a Polynucleotide

RNA isolated from entire families or individual patients presenting with a phenotype of interest (such as a disease) is be isolated.. cDNA is then generated from these RNA samples using protocols known in the art. (See, Sambrook.) The cDNA is then used as a template for PCR, employing primers surrounding regions of interest in SEQ ID NO:X. Suggested PCR conditions consist of 35 cycles at 95°C for 30 seconds; 60-120 seconds at 52-58°C; and 60-120 seconds at 70°C, using buffer solutions described in Sidransky, D., et al., Science 252:706 (1991).

PCR products are then sequenced using primers labeled at their 5' end with T4 polynucleotide kinase, employing SequiTherm Polymerase. (Epicentre Technologies).

The intron-exon borders of selected exons is also determined and genomic PCR products analyzed to confirm the results. PCR products harboring suspected mutations is then cloned and sequenced to validate the results of the direct sequencing.

PCR products is cloned into T-tailed vectors as described in Holton, T.A. and Graham, M.W., Nucleic Acids Research, 19:1156 (1991) and sequenced with T7 polymerase (United States Biochemical). Affected individuals are identified by mutations not present in unaffected individuals.

Genomic rearrangements are also observed as a method of determining alterations in a gene corresponding to a polynucleotide. Genomic clones isolated according to Example 2 are nick-translated with digoxigenindeoxy-uridine 5'-triphosphate (Boehringer Manheim), and FISH performed as described in Johnson, Cg. et al., Methods Cell Biol. 35:73-99 (1991). Hybridization with the labeled probe is carried out using a vast excess of human cot-1 DNA for specific hybridization to the corresponding genomic locus.

Chromosomes are counterstained with 4,6-diamino-2-phenylidole and propidium iodide, producing a combination of C- and R-bands. Aligned images for precise mapping are obtained using a triple-band filter set (Chroma Technology, Brattleboro, VT) in combination with a cooled charge-coupled device camera (Photometrics, Tucson, AZ) and variable excitation wavelength filters. (Johnson, Cv. et al., Genet. Anal. Tech. Appl., 8:75 (1991).) Image collection, analysis and chromosomal fractional length measurements are performed using the ISee Graphical Program System. (Inovision Corporation, Durham, NC.) Chromosome alterations of the genomic region hybridized by the probe are identified as insertions, deletions, and translocations. These alterations are used as a diagnostic marker for an associated disease.

Example 22: Method of Detecting Abnormal Levels of a Polypeptide in a Biological Sample

A polypeptide of the present invention can be detected in a biological sample, and if an increased or decreased level of the polypeptide is detected, this polypeptide is a marker for a particular phenotype. Methods of detection are numerous, and thus, it is understood that one skilled in the art can modify the following assay to fit their particular needs.

For example, antibody-sandwich ELISAs are used to detect polypeptides in a sample, preferably a biological sample. Wells of a microtiter plate are coated with specific antibodies, at a final concentration of 0.2 to 10 ug/ml. The antibodies are either monoclonal or polyclonal and are produced by the method described in Example 10.

The wells are blocked so that non-specific binding of the polypeptide to the well is reduced.

The coated wells are then incubated for > 2 hours at RT with a sample containing the polypeptide. Preferably, serial dilutions of the sample should be used to validate results. The plates are then washed three times with deionized or distilled water to remove unbounded polypeptide.

Next, 50 ul of specific antibody-alkaline phosphatase conjugate, at a concentration of 25-400 ng, is added and incubated for 2 hours at room temperature. The plates are again washed three times with deionized or distilled water to remove unbounded conjugate.

Add 75 ul of 4-methylumbelliferyl phosphate (MUP) or p-nitrophenyl phosphate (NPP) substrate solution to each well and incubate 1 hour at room temperature. Measure the reaction by a microtiter plate reader. Prepare a standard curve, using serial dilutions of a control sample, and plot polypeptide concentration on the X-axis (log scale) and fluorescence or absorbance of the Y-axis (linear scale). Interpolate the concentration of the polypeptide in the sample using the standard curve.

Example 23: Formulating a Polypeptide

The secreted polypeptide composition will be formulated and dosed in a fashion consistent with good medical practice, taking into account the clinical condition of the individual patient (especially the side effects of treatment with the secreted polypeptide alone), the site of delivery, the method of administration, the scheduling of administration, and other factors known to practitioners. The "effective amount" for purposes herein is thus determined by such considerations.

As a general proposition, the total pharmaceutically effective amount of secreted polypeptide administered parenterally per dose will be in the range of about 1 μg/kg/day to 10 mg/kg/day of patient body weight, although, as noted above, this will be subject to therapeutic discretion. More preferably, this dose is at least 0.01 mg/kg/day, and most preferably for humans between about 0.01 and 1 mg/kg/day for the hormone. If given continuously, the secreted polypeptide is typically administered at a dose rate of about 1 μg/kg/hour to about 50 μg/kg/hour, either by 1-4 injections per day or by continuous subcutaneous infusions, for example, using a mini-pump. An intravenous bag solution may also be employed. The length of treatment needed to observe changes and the interval following treatment for responses to occur appears to vary depending on the desired effect.

Pharmaceutical compositions containing the secreted protein of the invention are administered orally, rectally, parenterally, intracistemally, intravaginally,

intraperitoneally, topically (as by powders, ointments, gels, drops or transdermal patch), bucally, or as an oral or nasal spray. "Pharmaceutically acceptable carrier" refers to a non-toxic solid, semisolid or liquid filler, diluent, encapsulating material or formulation auxiliary of any type. The term "parenteral" as used herein refers to modes of administration which include intravenous, intramuscular, intraperitoneal, intrasternal, subcutaneous and intraarticular injection and infusion.

The secreted polypeptide is also suitably administered by sustained-release systems. Suitable examples of sustained-release compositions include semi-permeable polymer matrices in the form of shaped articles, e.g., films, or mirocapsules. Sustained-release matrices include polylactides (U.S. Pat. No. 3,773,919, EP 58,481), copolymers of L-glutamic acid and gamma-ethyl-L-glutamate (Sidman, U. et al., Biopolymers 22:547-556 (1983)), poly (2- hydroxyethyl methacrylate) (R. Langer et al., J. Biomed. Mater. Res. 15:167-277 (1981), and R. Langer, Chem. Tech. 12:98-105 (1982)), ethylene vinyl acetate (R. Langer et al.) or poly-D- (-)-3-hydroxybutyric acid (EP 133,988). Sustained-release compositions also include liposomally entrapped polypeptides. Liposomes containing the secreted polypeptide are prepared by methods known per se: DE 3,218,121; Epstein et al., Proc. Natl. Acad. Sci. USA 82:3688-3692 (1985); Hwang et al., Proc. Natl. Acad. Sci. USA 77:4030-4034 (1980); EP 52,322; EP 36,676; EP 88,046; EP 143,949; EP 142,641; Japanese Pat. Appl. 83-118008; U.S. Pat. Nos. 4,485,045 and 4,544,545; and EP 102,324. Ordinarily, the liposomes are of the small (about 200-800 Angstroms) unilamellar type in which the lipid content is greater than about 30 mol. percent cholesterol, the selected proportion being adjusted for the optimal secreted polypeptide therapy.

For parenteral administration, in one embodiment, the secreted polypeptide is formulated generally by mixing it at the desired degree of purity, in a unit dosage injectable form (solution, suspension, or emulsion), with a pharmaceutically acceptable carrier, i.e., one that is non-toxic to recipients at the dosages and concentrations employed and is compatible with other ingredients of the formulation. For example, the formulation preferably does not include oxidizing agents and other compounds that are known to be deleterious to polypeptides.

Generally, the formulations are prepared by contacting the polypeptide uniformly and intimately with liquid carriers or finely divided solid carriers or both. Then, if necessary, the product is shaped into the desired formulation. Preferably the carrier is a parenteral carrier, more preferably a solution that is isotonic with the blood of the recipient. Examples of such carrier vehicles include water, saline, Ringer's solution, and dextrose solution. Non-aqueous vehicles such as fixed oils and ethyl oleate are also useful herein, as well as liposomes.

The carrier suitably contains minor amounts of additives such as substances that enhance isotonicity and chemical stability. Such materials are non-toxic to recipients at the dosages and concentrations employed, and include buffers such as phosphate, citrate, succinate, acetic acid, and other organic acids or their salts; antioxidants such as ascorbic acid; low molecular weight (less than about ten residues) polypeptides, e.g., polyarginine or tripeptides; proteins, such as serum albumin, gelatin, or immunoglobulins; hydrophilic polymers such as polyvinylpyrrolidone; amino acids, such as glycine, glutamic acid, aspartic acid, or arginine; monosaccharides, disaccharides, and other carbohydrates including cellulose or its derivatives, glucose, manose, or dextrins; chelating agents such as EDTA; sugar alcohols such as mannitol or sorbitol; counterions such as sodium; and/or nonionic surfactants such as polysorbates, poloxamers, or PEG.

The secreted polypeptide is typically formulated in such vehicles at a concentration of about 0.1 mg/ml to 100 mg/ml, preferably 1-10 mg/ml, at a pH of about 3 to 8. It will be understood that the use of certain of the foregoing excipients, carriers, or stabilizers will result in the formation of polypeptide salts.

Any polypeptide to be used for therapeutic administration can be sterile. Sterility is readily accomplished by filtration through sterile filtration membranes (e.g., 0.2 micron membranes). Therapeutic polypeptide compositions generally are placed into a container having a sterile access port, for example, an intravenous solution bag or vial having a stopper pierceable by a hypodermic injection needle.

Polypeptides ordinarily will be stored in unit or multi-dose containers, for example, sealed ampoules or vials, as an aqueous solution or as a lyophilized formulation for reconstitution. As an example of a lyophilized formulation, 10-ml vials are filled with 5 ml of sterile-filtered 1% (w/v) aqueous polypeptide solution, and the resulting mixture is lyophilized. The infusion solution is prepared by reconstituting the lyophilized polypeptide using bacteriostatic Water-for-Injection.

The invention also provides a pharmaceutical pack or kit comprising one or more containers filled with one or more of the ingredients of the pharmaceutical compositions of the invention. Associated with such container(s) can be a notice in the form prescribed by a governmental agency regulating the manufacture, use or sale of pharmaceuticals or biological products, which notice reflects approval by the agency of manufacture, use or sale for human administration. In addition, the polypeptides of the present invention may be employed in conjunction with other therapeutic compounds.

Example 24: Method of Treating Decreased Levels of the Polypeptide

It will be appreciated that conditions caused by a decrease in the standard or normal expression level of a secreted protein in an individual can be treated by administering the polypeptide of the present invention, preferably in the secreted form. Thus, the invention also provides a method of treatment of an individual in need of an increased level of the polypeptide comprising administering to such an individual a pharmaceutical composition comprising an amount of the polypeptide to increase the activity level of the polypeptide in such an individual.

For example, a patient with decreased levels of a polypeptide receives a daily dose 0.1-100 ug/kg of the polypeptide for six consecutive days. Preferably, the polypeptide is in the secreted form. The exact details of the dosing scheme, based on administration and formulation, are provided in Example 23.

Example 25: Method of Treating Increased Levels of the Polypeptide

Antisense technology is used to inhibit production of a polypeptide of the present invention. This technology is one example of a method of decreasing levels of a polypeptide, preferably a secreted form, due to a variety of etiologies, such as cancer.

For example, a patient diagnosed with abnormally increased levels of a polypeptide is administered intravenously antisense polynucleotides at 0.5, 1.0, 1.5, 2.0 and 3.0 mg/kg day for 21 days. This treatment is repeated after a 7-day rest period if the treatment was well tolerated. The formulation of the antisense polynucleotide is provided in Example 23.

Example 26: Method of Treatment Using Gene Therapy

One method of gene therapy transplants fibroblasts, which are capable of expressing a polypeptide, onto a patient. Generally, fibroblasts are obtained from a subject by skin biopsy. The resulting tissue is placed in tissue-culture medium and separated into small pieces. Small chunks of the tissue are placed on a wet surface of a tissue culture flask, approximately ten pieces are placed in each flask. The flask is turned upside down, closed tight and left at room temperature over night. After 24 hours at room temperature, the flask is inverted and the chunks of tissue remain fixed to the bottom of the flask and fresh media (e.g., Ham's F12 media, with 10% FBS, penicillin and streptomycin) is added. The flasks are then incubated at 37°C for approximately one week.

At this time, fresh media is added and subsequently changed every several days. After an additional two weeks in culture, a monolayer of fibroblasts emerge. The monolayer is trypsinized and scaled into larger flasks.

pMV-7 (Kirschmeier, P.T. et al., DNA. 7:219-25 (1988)), flanked by the long terminal repeats of the Moloney murine sarcoma virus, is digested with EcoRI and HindIII and subsequently treated with calf intestinal phosphatase. The linear vector is fractionated on agarose gel and purified, using glass beads.

The cDNA encoding a polypeptide of the present invention can be amplified using PCR primers which correspond to the 5' and 3' end sequences respectively as set forth in Example 1. Preferably, the 5' primer contains an EcoRI site and the 3' primer includes a HindIII site. Equal quantities of the Moloney murine sarcoma virus linear backbone and the amplified EcoRI and HindIII fragment are added together, in the presence of T4 DNA ligase. The resulting mixture is maintained under conditions appropriate for ligation of the two fragments. The ligation mixture is then used to transform bacteria HB101, which are then plated onto agar containing kanamycin for the purpose of confirming that the vector has the gene of interest properly inserted.

The amphotropic pA317 or GP+am12 packaging cells are grown in tissue culture to confluent density in Dulbecco's Modified Eagles Medium (DMEM) with 10% calf serum (CS), penicillin and streptomycin. The MSV vector containing the gene is then added to the media and the packaging cells transduced with the vector. The packaging cells now produce infectious viral particles containing the gene (the packaging cells are now referred to as producer cells).

Fresh media is added to the transduced producer cells, and subsequently, the media is harvested from a 10 cm plate of confluent producer cells. The spent media, containing the infectious viral particles, is filtered through a millipore filter to remove detached producer cells and this media is then used to infect fibroblast cells. Media is removed from a sub-confluent plate of fibroblasts and quickly replaced with the media from the producer cells. This media is removed and replaced with fresh media. If the titer of virus is high, then virtually all fibroblasts will be infected and no selection is required. If the titer is very low, then it is necessary to use a retroviral vector that has a selectable marker, such as neo or his. Once the fibroblasts have been efficiently infected, the fibroblasts are analyzed to determine whether protein is produced.

The engineered fibroblasts are then transplanted onto the host, either alone or after having been grown to confluence on cytodex 3 microcarrier beads.

Example 27: Method of Treatment Using Gene Therapy - In Vivo

Another aspect of the present invention is using *in vivo* gene therapy methods to treat disorders, diseases and conditions. The gene therapy method relates to the introduction of naked nucleic acid (DNA, RNA, and antisense DNA or RNA) sequences into an animal to increase or decrease the expression of the polypeptide of the present invention. A polynucleotide of the present invention may be operatively linked to a promoter or any other genetic elements necessary for the expression of the encoded polypeptide by the target tissue. Such gene therapy and delivery techniques and methods are known in the art, see, for example, WO90/11092, WO98/11779; U.S. Patent NO. 5693622, 5705151, 5580859; Tabata H. et al. (1997) Cardiovasc. Res. 35(3):470-479, Chao J et al. (1997) Pharmacol. Res. 35(6):517-522, Wolff J.A. (1997) Neuromuscul. Disord. 7(5):314-318, Schwartz B. et al. (1996) Gene Ther. 3(5):405-411, Tsurumi Y. et al. (1996) Circulation 94(12):3281-3290 (incorporated herein by reference).

The polynucleotide constructs of the present invention may be delivered by any method that delivers injectable materials to the cells of an animal, such as, injection into the interstitial space of tissues (heart, muscle, skin, lung, liver, intestine and the like). These polynucleotide constructs can be delivered in a pharmaceutically acceptable liquid or aqueous carrier.

The term "naked" polynucleotide, DNA or RNA, refers to sequences that are free from any delivery vehicle that acts to assist, promote, or facilitate entry into the cell, including viral sequences, viral particles, liposome formulations, lipofectin or precipitating agents and the like. However, the polynucleotides may also be delivered in liposome formulations (such as those taught in Felgner P.L. et al. (1995) Ann. NY Acad. Sci. 772:126-139 and Abdallah B. et al. (1995) Biol. Cell 85(1):1-7) which can be prepared by methods well known to those skilled in the art.

The polynucleotide vector constructs of the present invention used in the gene therapy method are preferably constructs that will not integrate into the host genome nor will they contain sequences that allow for replication. Any strong promoter known to those skilled in the art can be used for driving the expression of DNA. Unlike other gene therapies techniques, one major advantage of introducing naked nucleic acid sequences into target cells is the transitory nature of the polynucleotide synthesis in the cells. Studies have shown that non-replicating DNA sequences can be introduced into cells to provide production of the desired polypeptide for periods of up to six months.

The polynucleotide construct of the present invention can be delivered to the interstitial space of tissues within the an animal, including of muscle, skin, brain, lung, liver, spleen, bone marrow, thymus, heart, lymph, blood, bone, cartilage, pancreas, kidney, gall bladder, stomach, intestine, testis, ovary, uterus, rectum, nervous system, eye, gland, and connective tissue. Interstitial space of the tissues comprises the intercellular fluid, mucopolysaccharide matrix among the reticular fibers of organ tissues, elastic fibers in the walls of vessels or chambers, collagen fibers of fibrous tissues, or that same matrix within connective tissue ensheathing muscle cells or in the lacunae of bone. It is similarly the space occupied by the plasma of the circulation and the lymph fluid of the lymphatic channels. Delivery to the interstitial space of muscle tissue is preferred for the reasons discussed below. They may be conveniently delivered by injection into the tissues comprising these cells. They are preferably delivered to and expressed in persistent, non-dividing cells which are differentiated, although delivery and expression may be achieved in non-differentiated or less completely differentiated cells, such as, for example, stem cells of blood or skin fibroblasts. *In vivo* muscle cells are particularly competent in their ability to take up and express polynucleotides.

For the naked polynucleotide injection, an effective dosage amount of DNA or RNA will be in the range of from about 0.05 g/kg body weight to about 50 mg/kg body weight. Preferably the dosage will be from about 0.005 mg/kg to about 20 mg/kg and more preferably from about 0.05 mg/kg to about 5 mg/kg. Of course, as the artisan of ordinary skill will appreciate, this dosage will vary according to the tissue site of injection. The appropriate and effective dosage of nucleic acid sequence can readily be determined by those of ordinary skill in the art and may depend on the condition being treated and the route of administration. The preferred route of administration is by the parenteral route of injection into the interstitial space of tissues. However, other parenteral routes may also be used, such as, inhalation of an aerosol formulation particularly for delivery to lungs or bronchial tissues, throat or mucous membranes of the nose. In addition, naked polynucleotide constructs can be delivered to arteries during angioplasty by the catheter used in the procedure.

The dose response effects of injected polynucleotide in muscle *in vivo* is determined as follows. Suitable template DNA for production of mRNA coding for the polypeptide of the present invention is prepared in accordance with a standard recombinant DNA methodology. The template DNA, which may be either circular or linear, is either used as naked DNA or complexed with

liposomes. The quadriceps muscles of mice are then injected with various amounts of the template DNA.

Five to six week old female and male Balb/C mice are anesthetized by intraperitoneal injection with 0.3 ml of 2.5% Avertin. A 1.5 cm incision is made on the anterior thigh, and the quadriceps muscle is directly visualized. The template DNA is injected in 0.1 ml of carrier in a 1 cc syringe through a 27 gauge needle over one minute, approximately 0.5 cm from the distal insertion site of the muscle into the knee and about 0.2 cm deep. A suture is placed over the injection site for future localization, and the skin is closed with stainless steel clips.

After an appropriate incubation time (e.g., 7 days) muscle extracts are prepared by excising the entire quadriceps. Every fifth 15 um cross-section of the individual quadriceps muscles is histochemically stained for protein expression. A time course for protein expression may be done in a similar fashion except that quadriceps from different mice are harvested at different times. Persistence of DNA in muscle following injection may be determined by Southern blot analysis after preparing total cellular DNA and HIRT supernatants from injected and control mice. The results of the above experimentation in mice can be use to extrapolate proper dosages and other treatment parameters in humans and other animals using naked DNA of the present invention.

It will be clear that the invention may be practiced otherwise than as particularly described in the foregoing description and examples. Numerous modifications and variations of the present invention are possible in light of the above teachings and, therefore, are within the scope of the appended claims.

The entire disclosure of each document cited (including patents, patent applications, journal articles, abstracts, laboratory manuals, books, or other disclosures) in the Background of the Invention, Detailed Description, and Examples is hereby incorporated herein by reference.

Sequence Listing

(1) GENERAL INFORMATION:

(i) APPLICANT: Human Genome Sciences, Inc., et al.

(ii) TITLE OF INVENTION: 207 Human Secreted Proteins

(iii) NUMBER OF SEQUENCES: 800

(iv) CORRESPONDENCE ADDRESS:

(A) ADDRESSEE: Human Genome Sciences, Inc.

(B) STREET: 9410 Key West Avenue

(C) CITY: Rockville

(D) STATE: Maryland

(E) COUNTRY: USA

(F) ZIP: 20850

(v) COMPUTER READABLE FORM:

(A) MEDIUM TYPE: Diskette, 3.50 inch, 1.4Mb storage

(B) COMPUTER: HP Vectra 486/33

(C) OPERATING SYSTEM: MSDOS version 6.2

(D) SOFTWARE: ASCII Text

(vi) CURRENT APPLICATION DATA:

(A) APPLICATION NUMBER:

(B) FILING DATE:

(C) CLASSIFICATION:

(vii) PRIOR APPLICATION DATA:

(A) APPLICATION NUMBER:

(B) FILING DATE:

(viii) ATTORNEY/AGENT INFORMATION:

(A) NAME: Kenley K. Hoover

(B) REGISTRATION NUMBER: 40,302

(C) REFERENCE/DOCKET NUMBER: PZ007PCT

(vi) TELECOMMUNICATION INFORMATION:

(A) TELEPHONE: (301) 309-8504

(B) TELEFAX: (301) 309-8439

(2) INFORMATION FOR SEQ ID NO: 1:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 733 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 1:

```
GGGATCCGGA GCCCAAATCT TCTGACAAAA CTCACACATG CCCACCGTGC CCAGCACCTG    60
AATTCGAGGG TGCACCGTCA GTCTTCCTCT TCCCCCCAAA ACCCAAGGAC ACCCTCATGA   120
TCTCCCGGAC TCCTGAGGTC ACATGCGTGG TGGTGGACGT AAGCCACGAA GACCCTGAGG   180
TCAAGTTCAA CTGGTACGTG GACGGCGTGG AGGTGCATAA TGCCAAGACA AAGCCGCGGG   240
AGGAGCAGTA CAACAGCACG TACCGTGTGG TCAGCGTCCT CACCGTCCTG CACCAGGACT   300
GGCTGAATGG CAAGGAGTAC AAGTGCAAGG TCTCCAACAA AGCCCTCCCA ACCCCCATCG   360
AGAAAACCAT CTCCAAAGCC AAAGGGCAGC CCCGAGAACC ACAGGTGTAC ACCCTGCCCC   420
CATCCCGGGA TGAGCTGACC AAGAACCAGG TCAGCCTGAC CTGCCTGGTC AAAGGCTTCT   480
ATCCAAGCGA CATCGCCGTG GAGTGGGAGA GCAATGGGCA GCCGGAGAAC AACTACAAGA   540
CCACGCCTCC CGTGCTGGAC TCCGACGGCT CCTTCTTCCT CTACAGCAAG CTCACCGTGG   600
ACAAGAGCAG GTGGCAGCAG GGGAACGTCT TCTCATGCTC CGTGATGCAT GAGGCTCTGC   660
ACAACCACTA CACGCAGAAG AGCCTCTCCC TGTCTCCGGG TAAATGAGTG CGACGGCCGC   720
GACTCTAGAG GAT                                                      733
```

(2) INFORMATION FOR SEQ ID NO: 2:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 5 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 2:

Trp Ser Xaa Trp Ser
1 5

(2) INFORMATION FOR SEQ ID NO: 3:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 86 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 3:

GCGCCTCGAG ATTTCCCCGA AATCTAGATT TCCCCGAAAT GATTTCCCCG AAATGATTTC 60

CCCGAAATAT CTGCCATCTC AATTAG 86

(2) INFORMATION FOR SEQ ID NO: 4:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 27 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 4:

GCGGCAAGCT TTTTGCAAAG CCTAGGC 27

(2) INFORMATION FOR SEQ ID NO: 5:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 271 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 5:

CTCGAGATTT CCCCGAAATC TAGATTTCCC CGAAATGATT TCCCCGAAAT GATTTCCCCG 60

AAATATCTGC CATCTCAATT AGTCAGCAAC CATAGTCCCG CCCCTAACTC CGCCCATCCC 120

GCCCCTAACT CCGCCCAGTT CCGCCCATTC TCCGCCCCAT GGCTGACTAA TTTTTTTTAT 180

TTATGCAGAG GCCGAGGCCG CCTCGGCCTC TGAGCTATTC CAGAAGTAGT GAGGAGGCTT 240

TTTTGGAGGC CTAGGCTTTT GCAAAAAGCT T 271

(2) INFORMATION FOR SEQ ID NO: 6:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 32 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 6:

GCGCTCGAGG GATGACAGCG ATAGAACCCC GG 32

(2) INFORMATION FOR SEQ ID NO: 7:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 31 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 7:

GCGAAGCTTC GCGACTCCCC GGATCCGCCT C 31

(2) INFORMATION FOR SEQ ID NO: 8:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 12 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 8:

GGGGACTTTC CC 12

(2) INFORMATION FOR SEQ ID NO: 9:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 73 base pairs
(B) TYPE: nucleic acid

(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 9:

GCGGCCTCGA GGGGACTTTC CCGGGGACTT TCCGGGGACT TTCCGGGACT TTCCATCCTG 60

CCATCTCAAT TAG 73

(2) INFORMATION FOR SEQ ID NO: 10:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 256 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 10:

CTCGAGGGGA CTTTCCCGGG GACTTTCCGG GGACTTTCCG GGACTTTCCA TCTGCCATCT 60

CAATTAGTCA GCAACCATAG TCCCGCCCCT AACTCCGCCC ATCCCGCCCC TAACTCCGCC 120

CAGTTCCGCC CATTCTCCGC CCCATGGCTG ACTAATTTTT TTTATTTATG CAGAGGCCGA 180

GGCCGCCTCG GCCTCTGAGC TATTCCAGAA GTAGTGAGGA GGCTTTTTTG GAGGCCTAGG 240

CTTTTGCAAA AAGCTT 256

(2) INFORMATION FOR SEQ ID NO: 11:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2526 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 11:

GACAGGCTAT CCGAGAATCT GAGAGCTGGG CCCGGCAATT CCTCCAGYTA CCCTTGTGAC 60

CTAAGTCCAG TCACACATTT CCCAAAGTTT CTCTTTGTCA TAACCCTGGT CTGGCTGGTT 120

TTGRGGRCTT GAGAATGGGT CAGGGACTCC AGGCCAAGTC CAACAGAGAC CCCAAACCCA 180

CCACACACCA GCAGCCACAA CCTCACCACC AACAAAGAGG ACTTTTGTGG GGCCACAAGT 240

AAGAGGTCAT TTCTGGAATG GACTCAGACC TTTAAACAGG AGAGTTGAGC ACTTCCAGKS 300

AGTTTTTAAG CAAGGCATGG GGAACAGGGA ATAGAACCTT TCAAAGAGGT TGCCCAGAGA 360

AAAGCTGGGC CTCTTGCATT CGGCTTCCTT GGAGCAGCCT CTTCTGGCAG AAAGCCATCA 420

GGTGCTCAAT CATCTTCTCC TGGCCAAGGC TCTGACCATG CTTAGTACTG GAATAGAGGT 480

GGCCAGGCCC CCAGCGACTC TTCTTGGCCT GATGTTTGTC CTCACAGGCA TGCCACGTGG 540
CCTGAGATGA TTCAGAACAA ATCATGCTAA CTTTGAATCC ATCCAGCCAC TTGCAAATGA 600
TAATCAGAAG TCAGCTTGTT CACTGTTAGA AAGAAACTAA CAAAAGAGAA CCCAGAGCAA 660
TCTAGAATCT TTGAGTGCTT GGCTTTCCAA GGATACTGCG GAGACTCTGG CCAAGCTGAT 720
GAMCTTCTGA ARTGTCACTG GCACCATATG CAACAAGAAC CACCATTCAC TGAGTAGCTA 780
ATGGGTTTGG GGCCTGGGAC ATTCCATCTG AGGTCCTTCC TGAACATGTC ACTCCACAGC 840
AGAGGACCGG TTGCAGCTTA CCCAGAACCA CTCCTCCAGG AGAGCTGGAT GTTTTGCGTG 900
CAACACCTTG AGCACTGACT GCTATTGTTC AAAAAAAGCC TTTGCTGCAT TCGGAGGACT 960
GCCCCGTGCC CTGAGGTGAC TTCCTAACTA TGTGGTTTCA TTAGCGAATT TATTTTTTGT 1020
GCTGGGTGGA CATTTGTATT TTGTTAGGTT GCTGTTTAAG CTCAAGTTTG CTGTGCTCTC 1080
TGCAGCTACA AAACATCTTG GCATATTTAA GAKTGGCTTT TATAAATAGC TTTATTCTGA 1140
TATTAATCAG ATTCCCAACT TTACTGAGAA TTAAGGACTG GGGTACTTTA AAGAAATGCA 1200
AATAGCAATT GAAGAACCAC TGCTGCAGGT GGTAGCCCTG GCTAGACTGA ATTACACTAG 1260
AAATCAGCCA GAAGGAAGCG TCCTTGGGAT CCCAGATCAC TCTTTTTTTT TTTTTTTTTA 1320
AAAGGGGCAG CCCCTTGATG GCTCATCTCT CTGAATAACA GTTACGTCTT CATATCGATA 1380
CCAGATGCCT TCTTCATCAT GCCACTGAAG CCACTCACCA CCTTCAAGAA CATGCCAACC 1440
TCTGTCAGAT TCACTTACCC ACAAACAAGG AGGCACGTTT GGCACAAAGT GTTGTCCTCC 1500
AGGTCCAAGT GGACTCTACA GAGTGCTTGA CCTCAACACA CTGGATTCCA GGTGGACTGG 1560
ACCAAGAGCA GGCAAAGACA CGGGAACTGA AAAACTCCAC AGGGTTTGGA GAATAGAAAT 1620
GAAAAGCCAC GTCATATAAC TCAAGAATAA ATGGTGTTTT GGAAATTTTA AAATTATCAT 1680
CGAAGGTGGT GAAACTATTT CAGGCCCAAA TGAAAGGAAA TCGCCAGTTG GGGATGAAAT 1740
CACAGAGCCT GTGTTTTATG ATATGGTTGG ATGTCCACTG ATGAAATTTT AAAGGAGTTT 1800
CATTTTTAAA AGTGCGCATG ATTCTACATA TGAGAATTCT TTAGGCCAAG AAACTGTCCT 1860
TGGCTCAGAG GTGTTGGGAA TTAAAGCAGA GAGAAGCCAT TCGTGATGCT TAGAACCAAG 1920
GATGGTCATG TACACAAAGA CCATCGAGAC GGCCATTCTT GTTTACAAAA CACTTACCAA 1980
GAAAGCACTT TGTAGGGGAA CTTTAGTAAG TTCTTCTCAT TTCATTATGT TTCTTCCAAG 2040
GAAACAGGAG AGACTGAATT AATAATTCTC TCTTTCCTCT TAAGCACTTT TAAAATAATA 2100
AAGTACATCT TGAAATTTGG GGGGGCATCT CTGATTTAAA AAAAGAAAAA GCCTGCTTGA 2160
TGTATGTTAT GCAGAGACAC TCTGCCTCTG GTGGCTGCAG AGCAATACCC AAGCCTCATT 2220
TGGAAGGCTC AACATTTGGA ATTGCACTTT AATTGATTAA TCCTCAATTC ATGTGGCCTT 2280

ACGGGATGGT GGGTCTGGGA CCCCAATTCA TTCTTATCTG CCAAAGAATT ATCTAGAAGC 2340

ACATCAAATA CCAGCACCCC ACCTGCACAA TGGGGGTGGA AAACTTTTGT ATCCCTAAGC 2400

ATATTATTTT ATAGTGTCTG CCATGCCATG TGGAAATACT TTATTTTTAA CCTCAGGATT 2460

TAAATAAAGT AAACACTATG ACATTTAAAA AAAAAAAAAA AAAACTCGAG GGGGGCCCGG 2520

TACCCA 2526

(2) INFORMATION FOR SEQ ID NO: 12:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1131 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 12:

CACTGCACCA GCTTTGTTAT CTGTAAAATG ATGATAATAC CAACACCTTC TTCTTGGGGT 60

ACTGAAGATG AGAGAACATG ATATGTGTAA AGTGCCTTCC ACAATACCCA GAACATAGCA 120

AACATGTAAT GAATGTAGTA ATAGTAATTA TTTTATTTTC TTTTGATTCA GTTGGGACTA 180

TGTTCAGCTG TAACAGAATA CCCAAAATAA CTGTTTTAAA CAAATTAAAG TTTWGTTGTG 240

AAGTTTTGTT ACGAATTCAG ACAATCCAGG GCTTTTATAG ATGCACCAGG ATCAGCAGGT 300

ACAAAGGCAT CTTTCCTGAT TTCTGCCAGT CTCAATGCAT GGGTTGCAAT CCAGARTCCA 360

RGATGGCAGT TCCAGCCCTG GTTACGCCCA TATTAGCACA CAGAAAGAAA GAGAAAGGGA 420

TGTGCCTCTT CACTTTAATC ATAGCTCCCA CTAGATGCAC CCACTACTTC TGCTGATACT 480

CCATTAGCTA ATGCTTGCTT ACATGGTCAC ACTTAGTTTC CAGAGAGACA TGTCTGGACA 540

GTCATGTGCT CAATTAATAT CCAAGTGTCC AATTACTGAG AAAAAAAGAA ACTAGCACCT 600

TTGCTTGGTT GCATTCCTCT TAGCATAAGC CACATTCTTT TTATGAAGTT GTCCTCAGTT 660

ACTTGGATGC CTCAGTTGTC CTTTCAWTTA GAAAWGCYCC TKGGACAYCC TGAAWCTGAC 720

TTCTTTTGTC ATCAGCACCA TCACTACCAC TGCCYTCTTC AAAGCCACCA CGTTCTGTCC 780

CCAGGATGGT TGCAACAACC ACCATAGGGA CTTTTTGCCT TCTACTTCCA CAGAATAGNC 840

CAGAGTAAGC TTTTGAAAAT GTAGGTCAGA TCATGTCTCT CTCTTCCTCT TCAAAACCCT 900

CCCGATGGCT TTTCATATTA CTCAAAAGAA AACCTAAAAC TTTGCTGTGA GATCTATGTG 960

ACCCGGCTTA TTCTTCCTCT TACTTTATCT CTGTATTGCT CTTCCTCACT CTACTCCAGC 1020

CATCCCACCT CCTTGCTGCT TGTCCTATAC TCCTAAAAGA AGTTCAGTCT TCCCTTATGA 1080

TATTTGCACT TAAAATAGAA AAAAAAAAA AAAAAAAACT CGAGGGGGGC C 1131

(2) INFORMATION FOR SEQ ID NO: 13:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 941 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 13:

GGCACGAGTA GCATTTCATT TAATCTGCAG GTATATTCTC CCAACAGTTT ATTGTCATGT 60

GATGTCCTCA GCCAAGATTG TRAGGCAGAG AGGAGCTGTC CCAACCTACT ATACCACCGA 120

GGCTGGAGAG ATCATATTTT TGGTATTAAA CTGGAGTCTC TCCATCCTTC ACATTGTTGA 180

TGTCCTCTGT AGCAAACCGG AAAAGTCAGT GACAGAAGAT GCCGCTAGCG GTTTGAGCCA 240

GAGAATGACA GCTCTGGTTT GGAGAAAAGG GCCGGATGGT GGCTCTAGAA AGCCCATCCT 300

TCTGCTCTTC TTTTTTCTCC CCCTTATATT GTGCTTTCAT TCATTCATTC ATTCATCAAA 360

CATTTGTTGA GCACCTATTA TGTGTCAAGC TCTGTGCTAG CCTCTGGAAA ACCTGCCCTC 420

ATGTAGCTCA CTGTGGAGTA GGAGAAACAA TGACTACACT ATGATAAGCA CGGGTTGTCA 480

GGGTCTCACA GAGCAGTGGC CCCTCATCCA GACCGATGAG GTCAAAGAAG GCATCCAGGC 540

GAGGATGGTG TCAGAGCTAA CTGAAGAATG AGAGGGAGCT GCACCASCAG GGGTTGGAAC 600

TGAAGGTGGC AGTGCCTGGA GTCTTGATTC CAGCAGAGGG AGAGCAGTCT GTGAAAAGGC 660

ACCAAGGGTG GGAGAGGGCA GAGCACATGG AGGAACTTCA GGTAGTTCTG GATGGCSCTG 720

GGGCAAAGCT AGAGAGGTAA GAAGAATCTA CAAATGTTCC TCGAGTTACA TGAACTTCCA 780

TCCCAATAAA CCCATTGGAA ACGAAAAATT TAAGTCAGAA GTGCATTTAA GGCTGGTCCG 840

AGTAGAATGA TTTTTACAAC GAATTGATCA CAACCAGTTA CAGATGTCTT TGTTCCTTCT 900

CCACTCCCAC TGCTTCACCT GACTAGCCTT TAAAAAAAAA A 941

(2) INFORMATION FOR SEQ ID NO: 14:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 843 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 14:

CNAGGGATAA CCCCAAAGNT GGGAAATAAA CCCTCAATTA AAGGGGGAAC CAAAAGCTG 60
GGAAGTTCCC CCCCGCGGTG GCGGCCNGNT CTAGGAACTA GTGGAATCCC CCGGGGCTGC 120
AGGGAATTCG GCACGGAGTG GGAATGTTGT TTGTATGATA CTATTTCCAC AAWATGCATT 180
GAGACTTGGT KTGTGGCCTA GGAGATGGTC AATTCTTTYT AAATATTCCG TGAATTTCTT 240
TAGTGCATAT TCTCCGATGG GGGCTGTGGG GACAGAGTTC TAAATATGCC CATTAGATTA 300
AATCTCTTCA TTCTGTTGCT CACATCTTCT ATATCCTTAT TAATCTGTCA ATCTCTTCAA 360
GAGAGGTGTT ATTAAAATCT CTCACTGTAT GTGTCACTTT GCCCTTAAAA TTCTGATGAT 420
TTGCTTTATA AATGGTTATA ACCATTTTCC AGGAAGAACA TTAAAGAACT TTCCATTGGC 480
ATTATCCAGT TTCCCTCAAA ATACTGGTTT TTTTTATTTT GGCTNCTAAG CAGCTATGAA 540
TCGAGTTTCT CAGAAGCCCT TGTCTCAAGG CATTTGTTTC CAGATTACCT TGTTAGCATC 600
CACACTATGG GCTATTTTAG AAAAACAAAA AAAGTATCAA AATCATATAG CTATGATTTT 660
CCTGTGCTTG AAGGAGCCTT AAAGCTCATC TAGTCCAGCC AGTATTTGTT CATCCAAATT 720
CTGCCAAGAA ATCTCTATTG TCAAGATATT CTTTACCATC TTTGGGACAT TCTCATTATT 780
AGAAACAAAT CCTAAGAAGA AATTCTGCCA TAKACAACCC ATCCGTTCTT TAAAAAAAAA 840
AAA 843

(2) INFORMATION FOR SEQ ID NO: 15:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1018 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 15:

CTGTAATTTT TAATTTTCAT ATACCGTGCT TTGATTCTAA TTTTATTTTT TGAGTTCTCT 60
GAAGGTTACA TATACAGAGT GCTTCAGGAA TGATCATTTT GTTATTATTC ATGCTTCTTA 120
ACAATGTTGT TTTAGTCCAA GAAGATAATT GCCAGAGAAA GAATACAGTG CAGGAAAGAA 180
GARGCTGGAG CCAGTGGTGA AGARGGATTG AGARGACAGA CATTGTGGGA ATGAAATCAT 240
GAATAATCGT GTTTTTGAAT TGTCCAAAAA CTTCTACAAA CCATGAAATG TTGGAGTTTA 300
AATCTAATTG TTGAAAAATT CCCCACATTC CTTGTATCCC TTAGGTTGAG CATAATTCCA 360
CATCCGTGGA CTGATGCACT TCCCAAGAGG GGGCCTCATT AACTCTTCCG AGGCAGCAGC 420
AGCAAGGGCA CCCCCTCCTT TCCCCCCACA CCCCAYTTCT CATGGCTCTT CTTTCTCTCA 480
TCTCATGCTT AGGTTAGAAA AGGGCACAAG GTAAGGAAGC CCTTGGGAAT AGGCTGAATC 540

TGGCTATCTA ATTTGGTGCC AAATACTTAA TGTGCTTGAA TTTAAAAACA GCAAACATGT 600

AGAAAGGTAA TTATAATTAT GAGGCCAGTT CTTTAAGCTA GCTTTTTTTC CCCTCTCAAA 660

CAGCATATTG GCTTGGATGT CAGCAGGAGA AAGTGTTTTT TGCAATACAC ATAATGCATA 720

TATGGTCCTG TTAGCAATCT ATAGAAAATA GATATTGCTC ATTAAGGTAA ATATTTTTGT 780

TGATGAATGA TCTGGAATGG TCTGGACTTG TTGTGTGAAC AGGAAATTGC TCTGTAGGCT 840

TTGACTTGTG AGGTAAAGAG TGAGGCTGGT AAGATTAATT AAAGTAAATA CTGTGACAAT 900

AGGATGTCAA AACCAAAAAC GTGTTTGTGA AACTCAAGGA ATTAATGACA CATAGGGAAG 960

TTTTTGCCAT ATTAAGCATA GAGTAGGAGA GGCAAGTCAA GAATAAAAAA AAAAAAA 1013

(2) INFORMATION FOR SEQ ID NO: 16:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 661 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 16:

TTTAAGAAAT TAGTGAATCC CCGGNTGCAG GGAATTCGGC ACGAGGAGGA GGCCGTCAGC 60

TGGCAGGAGC GCAGGATGGC AGCTGYTCCC CCGGGTTGCA CCCCCCCAGY TCTGCTGGAC 120

ATAAGYTGGT TAACAGAGAG CCTGGGAGCT GGGCAGCCTG TACCTGTGGA GTGCCGGCAC 180

CGCCTGGAGG TGGCTGGGCC AAGGAAGGGG CCTCTGAGCC CAGCATGGAT GCCTGCCTAT 240

GCCTGCCAGC GCCCTACGCC CCTCACACAC CACAACACTG GCCTMTCCGA GCTGCTGGAG 300

CATGGAGTGT GTGAGGAGGT GGAGAGAGTT CGGCGCTCAG AGAGGTACCA GACCATGAAG 360

GTGCGCAGGG CAGGGCTCGG ACCTACCCCA GGAATGTCCT GCCCTGGGAA TGACAACACA 420

GTCCACACCA TGCACGGGGA GGCAAACAGG GGCAGCTGAC CCAGCCCAGG GGTCAGANGA 480

GGTCTTGCCG AGGAAGTGGC AGCTAAGCTG ATACCTGATA TGCACWAGKC AGCCARGYGG 540

AGACAGGCAA GGAAGAAGCT TGTTTTGAGG ACAGAATTTT CTAGATCACT CAGCACCATC 600

TGGCTTTTGG GGCTTTTTGT TTTATTTTGT TTTTGAGACG GGGTCTCGCT CTGTCGCCCA 660

N 661

(2) INFORMATION FOR SEQ ID NO: 17:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 553 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 17:

```
GGCACAGGGC TATTTGCCCC TCTCTCCACA TGACAGAACT GCTCTAAGTT TCTTTGCTGC    60
TCTTCTCAGC TGTCAGACGG CTTGCTGCTT GTTTTCCACA CCACCATGTC TATTCTTTGC   120
TGTCCTTWAC TCTGCCTGTT TTTTTCCTTT TGTATTTCTT CTGGCTCTTG TCCCTTTTCC   180
CACGTGTCWC AGCTTTCCTT TATTGCCACT TTCAGTCAGA GCAGTCCTGT GCTTCTGGTG   240
CCGGCATACA ATACTTACTT GAGTTTCTTG GCTTTTCTTG ACTGTGCATC TCTTACTTCA   300
ACATAGGAAT AGCCTGTCAT AGAATTTCTC CAGTTCCAGG GCTCAAGAGG GAGAGTGCCA   360
GAAAATTGAG ACTGTTTTCC CTGTCTTGGA TTGAATTCAT AAAGCAAAAC CAGTGTTTGT   420
GTGAGGGTTT GCTGTGTCAT GCCTATAGGT TGTTTGGGTG CAAACCTATA GAATCCAGCC   480
TGCGAAAAGA AAGRAACCAG AGAATANCAG CATCAGAACA ATGCTTGACA TCATTTCTCA   540
ATCAAGCAGT CCA                                                      553
```

(2) INFORMATION FOR SEQ ID NO: 18:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 869 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 18:

```
GGCACGAGCT GCCAACACTG AGGTCTTCGT GGCTTCTCAC ATCTAGATGT ATCCCTCTCA    60
AATCTATCCT CTATCCAGGC ACCAGATTGA GGTATCTAAA ATGTCAACTT TCCAGTTACT   120
CCTTCTTATA CTAGCCCAAT CAACTTACAA GATAAAGTCC AAGCCCCTTC ATATGACAAA   180
CCACACCCTG CTTAACTCTC CAGGTTTGAA TCCTTCATCT CCTACTTTAA ACTTTAAAAC   240
CCAGCAGCAC GAAAGTGTCT CCTATGCATG TTGCCATATG CGTTCTCTCC ATCATGCATT   300
TGCCTGAGCA AGATGTCTTG AGTTAACATC TTATTCTTTA AGACTCATTG TGGTGGTAGA   360
CAGCCTTTAA TAACGGATCC TTGGCCAGGC ACAGTGACTC ACACCTGTAA TCCCAGAACT   420
TTGAAAGGCC AAAGAAGGAA GAAAGCTTGA GGCCAGTAGT TTGAGACCAG CCTGGGAAAC   480
AGAGAGATAT CCCATCTGTA CCAAAAATTT AAAAAAATAT TAGCAGGGAG TAGTGGCATG   540
CACAAGTGGT CCCAGCTCCA TGGGAGASTG AGGTAGGAAC ATCACTTGAG CCCAGGAAGT   600
```

```
CAAGGCTGCA GTGAACCATG ATCAGAACAT TGCANTCCAG CTTGGGTAAC AGAGTGAGAC    660

CTTAGGTCAG AAAAATGAAT AAATAAGCAT AAAATTTTAA AAACTTAGCC AGGCATGGTG    720

GCACACATCT GTGGTCCCTG CTACTTAGGA GGCTGAGGTG AGAGGATCCT TGAGCCCAGG    780

AGGTCAACAC TACAGTGAGC TATGATTGTG CCACTAAACT CCAACCTGGG TGAAAAAGCA    840

AAACCCTGCC AAAAAAAAAA AAAAAAACT                                       869
```

(2) INFORMATION FOR SEQ ID NO: 19:

(i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 959 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 19:

```
GGCGAGCCGA GATCGTGCCA TTGCACTCCA GCCTGGGCAA CAAGAGTGAA ACTCTGTCTC     60

AAAAAAAAAA AATTATAATA CTATATGCCA TAAAATGACA TTTCATATTT AAAGAGTTTT    120

TTAAAACTCT TGTATTCACA TGCCATAATT TGAAACCCTA TTTCACTGAA TGAGAATGGT    180

ATCTGTTGTC CTCATTTTTT CATTTTTATC CTTAACAATT TCCACCACAG CCAGTGCATA    240

TAATGGCAAT GACACCCAGG GATGGAATGA TAAGTTCCAT CRCMGCTCAG TCAAGACGCA    300

GACTTGATGT GGCCCCAACA ACAGTCAATA ATGGAGTCTC CAAAATAAAG CTCTATAGGA    360

AAGGTAAATA CCCGCTGCAC AAGAAACCAC AGCATCTAGG TTCTAACCCC ATCTCTATGA    420

AGAGCTTGCT GGGAGAGTTT TGACATTWAA CAATCTGTCT GATKGCCAAT TTTYTTCTTC    480

TATAAAATGA TAATGTTKGA YTCAAAGATC CAAAGTCAAT TCATGGTCTA AAACTTAATG    540

ATTTTTTTAG GTTTTGKGAC ATTTCACTGT ACACTGTAGT AATTTATATC TTATTTTCCC    600

ACTAATTTAG AAAAATATYT AAATGATCCT TAATTGGCAA TGGGTCCTAA GAATTTTGTT    660

TTAAATCCCT GTTACCCAAA AGAGCCCTTT TTTGTATCTC GCAGTAGTTA CAAGGATCTT    720

TCTAAATCTT AAAAAAAAAA AAAAAAGAAA GAAAGAAAAG AAAAGAAAAA AAGTCAGCCG    780

GGCGTGGTGG CTCATGCCTG TAATCCCAGC ACTTTGGGAC CAAGGTGGAC AGATCACGAG    840

GTCAGGAGAT GGAGACCATC CCGGCCAACA TGGAGAAACC CTGTCTCTAC TAAAAAAAAA    900

AAAAACTCGA GGGGGGCCCG GTACCCAATN CGCCGGCTAG TGGTCGTAAA ACAATCAAA     959
```

(2) INFORMATION FOR SEQ ID NO: 20:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1446 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 20:

```
CGGGGCAGGG CTGTGTGGCA CCGCCAGGGA GCGGGCCCAC CTGAGTCACT TTATTGGGTT     60
CAGTCAACAC TTTCTTGCTC CCTGTTTTCT CTTCTGTGGG ATGATCTCAG ATGCAGGGGC    120
TGGTTTTGGG GTTTTCCTGC TTGTGCCAAG GGCTGGACAC TGCTGGGGGG CTGGAAAGCC    180
CCTCCCTTCC TGTCCTTCTG TGGCCTCCAT CCCCTCATGG GTGCTGCCAT CCTTCCTGGA    240
GAGAGGGAGG TGAAAGCTGG TGTGAGCCCA GTGGGTTCCC GCCCACTCAC CCAGGAGCTG    300
GCTGGGCCAG GACCGGGAGA GGGAGCACTG CTGCCCTCCT GGCCCTGCTC CTTCCGCAGT    360
TAGGGGTGGA CCGAGCCTCG CTTTCCCCAC TGTTCTGGAG GGAAGGGGAA GGAGGGGGTC    420
TTCAGGCTGG AGCCAGGCTG GGGGTGCTGG GTGGAGAGAT GAGATTTAGG GGGTGCCTCA    480
TGGGGTGGGC AGGCCTGGGG TGAAATRAGA AAGGCCCAGA ACGTGCAGGT CTGCGGAGGG    540
GAAGTGTCCT GAGTGAAGGA GGGGACCCCC ATCCTGGGGG ATGCTGGGAG TGAGTGAGTG    600
AGATGGCTGA GTGAGGGTTA TGGGGAGCCT GAGGTTTTAT GGGCCTGTGT ATCCCCTTCT    660
CCCGGCCCCA GCCTGCCTCC CTCCTGCCCG CCTGGCCCAC AGGTCTCCCT CTGGTCCCTG    720
TCCCTCTGGT GGTTGGGGAT GGAGCGGCAG CAAGGGGTGT AATGGGGCTG GGTTCTGTCT    780
TCTACAGGCC ACCCCGAGGT CCTCAGTGGT TGCCTGGGGA GCCGGACGGG GCTCCTGAGG    840
GGTACAGGTT GGGTGGGCCC TCCCTGAGGG TCTGGGGTCA GGCTTTGGCT CTGCTGCCTC    900
TCAGTCACCA AGTCACCTCC CTCTGAAAAT CCAGTCCCTT CTTTGGATGT CCTTGTGAGT    960
CACTCTGGGC CTGGCTGTCG TCCCTCCTCA GCTTCTTGTT CCTGGGACAA GGGTCAAGCC   1020
AGGATGGGCC CAGGCCTGGG ATCCCCCACC CCAGGACCCC CAGGCCCCCT CCCCTGCTGC   1080
TTTGCGGGGG GCAGGGCAGA AATGGACTCC TTTTGGGTCC CCGAGGTGGG GTCCCCTCCC   1140
AGCCCTGCAT CCTCCGTGCC STAGACCTGC TCCCCAGAGG AGGGGCCTTG ACCCACAGGA   1200
CGTGTGGTGG CGCCTGGCAC TCAGGGACCC CCAGCTGCCC CAGCCCTGGT CTCTGGCGCA   1260
TCTCTTCCCT CTTGTCCCGA AGATCTGCGC CTCTAGTGCC TTTTGAGGGG TTCCCATCAT   1320
CCCTCCCTGA TATTGTATTG AAAATATTAT GCACACTGTT CATGCTTCTA CTAATCAATA   1380
AACGCTTTAT TTAAAGCCAA AAAAAAAAAA AAAAAACTCG AGGGGGGGCC CGTACCCAAT   1440
TCGCCA                                                              1446
```

(2) INFORMATION FOR SEQ ID NO: 21:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1471 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 21:

```
CAAAAAATAA TAATGATAAT TTAAAATAAA TAAGTAACTA ATAAAAAGAT TTTATATCCC     60
AGTCTTATGA TGTTGGTTGG CAAGGCTAGA TAAAAAGATG TTAGAATGAA AGAACATATT    120
TTTAGTGATA TGTAAATGAA GGATTCTACA ATAGTCATAT ATTTTTATAT GAATGAATGT    180
TGGGTTGGGC TGGAGAGGTA TGTGTGTGTA AATATAAAGG TCTCACATTC AGAGTATAGC    240
TCTGAAATAA TGGAACTCAT GTCTACAATT CAACATGCAT CTGTATAGTT ACATCTCATG    300
TAAATATACA CAGACATATT TTGCAGCCAG TAATTGACAG TTAATGTCCA AAACAGGTGA    360
TTGATAGGTA ACAGAAATTA GATAACCACC AATTTTGCCC AAGAGAAAGA CTAGAAGGAC    420
TAAAAGCAGT TGAATGTATG GTACTGACAT TGTCATAAGC AGTCTGATAA CCAGTTTATT    480
GAAACGTGTG CATTAACAGA GAATTTAATT TTAAACCCAT AATTTCTCCT ATCCATTAAA    540
ATATTATAAT TGTTAGTAGT ATGAAACCAA CAGGAAATGT TTTTTAATCA TTTAGTGAGG    600
TGATTCATTT GTTTCATGGG CAAACACTAT CCAGGAAAAG CCTTGCTTGC CTGTTTCCCA    660
AAGAGCTCTA AGAAATAGAA TCAAGTGTAA AATGGTTCAG ACCATTCAGG ATTTCTTGTC    720
ACTCTTCTCA ACCCCGATCT TCCTGTTATT ACTGATGTTT GAAACCCTGT CATTAGCCCC    780
GGCCTGGTTA AAGCCCCTCA GAGTCACCTC TCATTCATAG CAATAGAATT CAACCCCAAG    840
TGGTTGATGG TGTCCCCAGC ACAGCCGAGA GACCTGATCT CTGGATTCAG TGCTTTTAGC    900
TCTTCGAGTT TACCCTAAGA TACCTTCGGG CAATATTTTT AACCAACCCA AAAGCTCTTC    960
AGGTCATTTC TGAAGAGGAC AAGGTGAATC TTGGCTTGGA ACACCATTTT TGGGCTCTTG   1020
CTACTGAATG AATCAGAAAG GAATTTTTTC TGAAGAGCAT TAGAAAGTAA AGGAGATGTT   1080
AAAATAAGTT CTTGAAGTAT GTTTTATATT TATCTAAAAC ACTGATTTTA AAAGTTTACA   1140
TTCAAATGTG TATTCAAAAG AAGTACTGAT TTGTAATTAT TATAGTTTGT GTGTATCATC   1200
CCCTTTTAAC CGTGCCTAAC AACTGTACTT AAATTTTGTT TTCCTAGTGT AACAAATGTT   1260
TCCCATAAGA TTTTCTAGAG CCAAATAATG GGAGTGAAAA ATTCCTTAAG TGTTATATAA   1320
GAAAATATAT TAGAAAATCA GCTTTGGATT ATACGATTTC TAAAATATAC TAATACAGAA   1380
TCCTCAGTAA TATGTTTTGA ATTGGATTTT TTCTCAGAAC TGTTACATAA TAAATAATAC   1440
ATCAACCAGA AAAAAAAAAA AAAAAAATTN C                                  1471
```

(2) INFORMATION FOR SEQ ID NO: 22:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1402 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 22:

```
AGGGACGTCT TGCCTGAGGA GATGCCCATT TCTGTCCTGG RTTACCCTCA CTGCGTGGTG     60
CATGAGCTGC CAGAGCTGAC GGCGGAGAGT TTGGAAGCAG GTGACAGTAA CCAATTTTGC    120
TGGAGGAACC TCTTTTCTTG TATCAATCTG CTTCGGATCT TGAACAAGCT GACAAAGTGG    180
AAGCATTCAA GGACAATGAT GCTGGTGGTG TTCAAGTCAG CCCCCATCTT GAAGCGGGCC    240
CTAAAGGTGA AACAAGCCAT GATGCAGCTC TATGTGCTGA AGCTGCTCAA GGTACAGACC    300
AAATACTTGG GGCGGCAGTG GCGAAAGAGC AACATGAAGA CCATGTCTGC CATCTACCAG    360
AAGGTGCGGC ATCGGCTGAA CGACGACTGG GCATACGGCA ATGATCTTGA TGCCCGGCCT    420
TGGGACTTCC AGGCAGAGGA GTGTGCCCTT CGTGCCAACA TTGAACGCTT CAACGCCCGG    480
CGCTATGACC GGGCCCACAG CAACCCTGAC TTCCTGCCAG TGGACAACTG CCTGCAGAGT    540
GTCCTGGGCC AACGGGTGGA CCTCCCTGAG GACTTTCAGA TGAACTATGA CCTCTGGTTA    600
GAAAGGGAGG TCTTCTCCAA GCCCATTTCC TGGGAAGAGC TGCTGCAGTG AGGCTGTTGG    660
TTAGGGGACT GAAATGGAGA GAAAAGATGA TCTGAAGGTA CCTGTGGGAC TGTCCTAGTT    720
CATTGCTGCA GTGCTCCCAT CCCCCACCAG GTGGCAGCAC AGCCCCACTG TGTCTTCCGC    780
AGTCTGTCCT GGGCTTGGGT GAGCCCAGCT TGACCTCCCC TTGGTTCCCA GGGTCCTGCT    840
CCGAAGCAGT CATCTCTGCC TGAGATCCAT TCTTCCTTTA MTTCCCCCAM CCTCCTCTCT    900
TGGATATGGT TGGTTTTGGC TCATTTCACA ATCAGCCCAA GGYTGGGAAA GCTGGAATGG    960
GATGGGAACC CCTCCGCCGT GCATCTRAAT TTCAGGGGTC ATGCTGATGC CTCTCGAGAC   1020
ATACAAATCC TTGCCTTTGT CAGCTTGCAA AGGAGGAGAG TTTAGGATTA GGGCCAGGGC   1080
CAGAAAGTCG GTATCTTGGT TGTGCTCTGG GGTGGGGGTG GGGTGTTTCT GATGTTATTC   1140
CAGCCTCCTG CTACATTATA TCCAGAAGTA ATTGCGGAGG CTCCTTCAGC TGCCTCAGCA   1200
CTTTGATTTT GGACAGGGAC AAGGTAGGAA GAGAAGCTTC CCTTAACCAG AGGGGCCATT   1260
TTTCCTTTTG GCTTTCGAGG GCCTGTAAAT ATCTATATAT AATTCTGTGT GTATTCTGTG   1320
TCATGTTGGG GTTTTTAATG TGATTGTGTA TTCTGTTTAC ATTAAAAAGA AGCAAAAATA   1380
```

ATAAAAAAAA AAAAAAAAAA CT 1402

(2) INFORMATION FOR SEQ ID NO: 23:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1047 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 23:

```
GGCACAGGGG ACTACAGGCA CCCACGACCA TACCCAGCTA ATTTTTGTAT TTTTTTGTAG     60
AGATGGGGTT TCACGATGTC GCCCAGGCTG GTCTTGAACT CCTGGGCTTG AGCGATCTTC    120
CCATCTTTCC ATCTTGGCCT CCTAAAGTGC TGGGACTGCA GGCATGAGCC ACCATGCCCA    180
GCCAAGATTC TTATTGATTA CCATGTTGCT TCAAGAAGCC AAGCCAGTTT CCAATATTCC    240
CCATTTGCTG GAGTCTTGGT ACTTTGGGTA GAAGCAACTG GTAAATTGTT AATTGGAACA    300
NTTGGTGGTG TAGATAACCA CGTATGGCCA AACCTAGAGC ATCTAGGCTC ACAATTACTA    360
TCCTGACTTG ATAACAAGTG TTCTGATATT AACCTGAAAA TGGGAATAAT GCCAAATCTG    420
TGTAACTTAA CATCTATATA CACAGTGGGG AGAACTGAAG TTATTAAACC TGGAATCTCT    480
GTGATCAAGG CTAACAGTAG TTATCTAAGA AGCAAAGGAC CTACAATTCT TAGACTTGGA    540
GTCATATTCT TTAAGGACGT GTTCTGAAAC TATATCAAGC ATCTGGTTTC CACGTATTTC    600
TCCCTCAGAA ATTATGAAGT ACAAGTAAAA ATGAAGGTAC AGGGTAAGAC ACATGCTGCT    660
TTCTTGCTCT TGAGTGGAGA CAGTTTTCCA GCCATCTTAA CCCCTTWACA CAAAACAATT    720
TGTGTTTTAT AGCAAATAAG TGACTCAACA TAATTTCAAT ATGATGTTTA TCCACCAGTA    780
CTTTCCTTTC AGCTTCTAGT CCCATAARTG GTTTGTGAAG TCATCGGTTA CATTAGCCAA    840
GATAGGCCTA GACTTGAAGT CTAGAATGTT TTTCCCACTA TATGCCAAAG TAGAATGTGG    900
GTATCTCAGG GTCATTTTTG TTGTTCAATT TCCCACCTGT ACAGTTGTTA TGATTCACTT    960
TCCTTATGTG TCTAATAAAT CTTGTTCCAT GAAATGATCA AAAAAAAAAA AAAAAAAACT   1020
CGAGGGGGGG CCCGGTACCC AAATCGC                                       1047
```

(2) INFORMATION FOR SEQ ID NO: 24:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 990 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 24:

```
TTGGAAAGGG TCTAGCTCTT TCTCATTCAC CAACTATATT AGAAGCACTT GAGGGAAATT     60
TACCACTCCA AATCCAAAGC AATGAACAGT CTTTTCTGGA TGATTTTATT GCCTGTGTCC    120
CAGGATCAAG TGGTGGAAGG CTTGCAAGGT GGCTTCAGCC AGATTCATAT GCGGATCCTC    180
AGAAAACATC TTTGATCCTG GAATAAGGAT GATATTCGTT GTGGTTGGCC TACCACCATA    240
ACTGTTCAAA CAAAAGACCA GTATGGGGAT GTGGTACATG TTCCCAATAT GAAGGTAATT    300
ATAACTGGAT TAAATTAGCA GACATCTATA TACTGGCTGC AATGACTGAT AAAATTTTAG    360
AAATGCCAAG TGCTGAGRGT CCATTTGTTC TACCCTCTTT ATATAAAGGG TGATGCTGAA    420
AGTTTGTTTA AATGACTTGT TTATATTAAT TAGTCCCCAA GTGTCCAAGT TACACCTGTT    480
TTTTTTGTGA GTTTGTTCTT TACATTTTGC TACCTGTTAC GGGGACTCAA AGGAGGGATA    540
AGAAAGTATC CATCTAAAGA GTGCTAGACA CATACAGTGA AGCCCCTCAA TATGTATTGA    600
TTGAATAAAT GCATGAAAGA ATACATTTTT AAATTTTGTG TATAGTTTTG AAAGACTCAA    660
GTACGTTCTG TGTTTGGTAT TACTGAAACC ACATTTTAAA AATAACACTC ATTAAGTTAG    720
AAATATATGA GTTTAGATTG TAAAAGAATG AGGAATTGAA ATAGTTGTAT ACCATATTGA    780
TGAATATAGA GTTTTTAGGA TACCTCTTAC CTGAAATATT AATAATAATG TTTNCAGAGC    840
ATATTATACA TAATTATTTG TGATTTAATC TGTTAATATG AATATCTCAT TTAAAACTTT    900
TATTTCTGAA AAAATTATAT TGAATAAAAT TTTATATAGG CAGTCCCCAG CCCTTTCCTC    960
CTTCAAAGTT GTCTTATAGA GTGATTGGTT                                     990
```

(2) INFORMATION FOR SEQ ID NO: 25:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1208 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 25:

```
TAATCGCTAC TATAGGGAAA GCTGGTCGCT GCAGGTACCG GTCCGGAATT CCGGGTCGAC     60
CCACGCGTCC GAGCGAAATG GCGCCTCCGG CCCCCGGCCC GGCCTCCGGC GGCTCCGGGG    120
AGGTAGACGA GCTGTTCGAC GTAAAGAACG CCTTCTACAT CGGCAGCTAC CAGCAGTGCA    180
TAAACGAGGC GCASGGGTGA AGCTRTCAAG CCCAGAGAGA GACGTGGAGA GGGACGTCTT    240
CCTGTATAGA GCGTACCTGG CGCAGAGGAA GTTCGGTGTG GTCCTGGATG AGATCAAGCC    300
```

```
CTCCTCGGCC CCTGAGCTCC AGGCCGTGCG CATGTTTGCT GACTACCTCG CCCACGAGAG    360
TCGGAGGGAC AGCATCGTGG CCGAGCTGGA CCGAGAGATG AGCAGGAGCK TGGACGTGAC    420
CAACACCACC TTCCTGCTCA TGGCCGCCTC CATCTATCTC CACGACCAGA ACCCGGATGC    480
CGCCCTGCGT GCGCTGCACC AGGGGACAG CCTGGAGTGC ACAGCCATGA CAGTGCAGAT    540
CCTGCTGAAG CTGGACCGCC TGGACCTCGC CCGGAAGGAG CTGAAGAGAA TGCAGGACCT    600
GGACGAGGAT GCCACCCTCA CCCAGCTCGC CACTGCCTGG GTCAGCCTGG CCACGGGTGG    660
TGAGAAGCTG CAGGATGCCT ACTACATCTT CCAGGAGATG GCTGACAAGT GCTCGCCCAC    720
CCTGCTGCTG CTCAATGGGC AGGCGGCCTG CCACATGGCC CAGGGCCGCT GGGAGGCCGC    780
TGAGGGCCTG CTGCAGGAGG CGCTAGACAA GGATAGTGGC TACCCRGAGA CGCTGGTCAA    840
CCTCATCGTC CTGTCCCAGC ACCTKGGCAA GCCCCCTGAG GTGACAAACC GATACCTGTC    900
CCAGCTGAAG GATGCCCACA GGTCCCATCC CTTCATCAAG GAGTACCAGG CCAAGGAGAA    960
CGACTTTGAC AGGCTGGTGC TACAGTACGC TCCCAGCGCT GAGGCTGGGC CAGAGCTGTC   1020
AGGACCATGA AGCCAGGACA GAGGCCAGGA GCCAGCCCTG CAGCCCTCCC CACCCGGCAT   1080
CCACCTGCAT CCCTCTGGGG CAGGAGCCCA CCCCCAGCAC CCCCATCTGT TAATAAATAT   1140
CTCAACTCCA RGGTGTTCCA CCTGAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA   1200
AAAAAAAA                                                            1208
```

(2) INFORMATION FOR SEQ ID NO: 26:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1922 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 26:

```
GTGCTGCGCT ACTGAGCAGC GCCATGGAGG ACTCTGAAGC ACTGGGCTTC GAACACATGG     60
GCCTCGATCC CCGGCTCCTT CAGGCTGTCA CCGATCTGGG CTGGTCGCGA CCTACGCTGA    120
TCCAGGAGAA GGCCATCCCA CTGGCCCTAG AAGGGAAGGA CCTCCTGGCT CGGGCCCGCA    180
CGGGCTCCGG GAAGACGGCC GCTTATGCTA TTCCGATGCT GCAGCTGTTG CTCCATAGGA    240
AGGCGACAGG TCCGGTGGTA GAACAGGCAG TGAGAGGCCT TGTTCTTGTT CCTACCAAGG    300
AGCTGGCACG GCAAGCACAG TCCATGATTC AGCAGCTGGC TACCTACTGT GCTCGGGATG    360
TCCGAGTGGC CAATGTCTCA GCTGCTGAAG ACTCAGTCTC TCAGAGAGCT GTGCTGATGG    420
```

```
AGAAGCCAGA TGTGGTAGTA GGGACCCCAT CTCGCATATT AAGCCACTTG CAGCAAGACA    480
GCCTGAAACT TCGTGACTCC CTGGAGCTTT TGGTGGTGGA CGAAGCTGAC CTTCTTTTTT    540
CCTTTGGCTT TGAAGAAGAG CTCAAGAGTC TCCTCTGTCA CTTGCCCCGG ATTTACCAGG    600
CTTTTCTCAT GTCAGCTACT TTTAACGAGG ACGTACAAGC ACTCAAGGAG CTGATATTAC    660
ATAACCCGGT TACCCTTAAG TTACAGGAGT CCCAGCTGCC TGGGCCAGAC CAGTTACAGC    720
AGTTTCAGGT GGTCTGTGAG ACTGAGGAAG ACAAATTCCT CCTGCTGTAT GCCCTGCTCA    780
AGCTGTCATT GATTCGGGGC AAGTCTCTGC TCTTTGTCAA CACTCTAGAA CGGAGTTACC    840
GGCTACGCCT GTTCTTGGAA CAGTTCAGCA TCCCCACCTG TGTGCTCAAT GGAGAGCTTC    900
CACTGCGCTC CAGGTGCCAC ATCATCTCAC AGTTCAACCA AGGCTTCTAC GACTGTGTCA    960
TAGCAACTGA TGCTGAAGTC CTGGGGGCCC CAGTCAAGGG CAAGCGTCGG GGCCGAGGGC   1020
CNAAAGGGGA CAAGGCCTCT GATCCGGAAG CAGGTGTGGC CCGGGGCATA GACTTCCACC   1080
ATGTGTCTGC TGTGCTCAAC TTTGATCTTC CCCCAACCCC TGAGGCCTAC ATCCATCGAG   1140
CTGGCAGGAC AGCACGCGCT AACAACCCAG GCATAGTCTT AACCTTTGTG CTTCCCACGG   1200
AGCAGTTCCA CTTAGGCAAG ATTGAGGAGC TTCTCAGTGG AGAGAACAGG GGCCCCATTC   1260
TGCTCCCCTA CCAGTTCCGG ATGGAGGAGA TCGAGGGCTT CCGCTATCGC TGCAGGGATG   1320
CCATGCGCTC AGTGACTAAG CAGGCCATTC GGGAGGCAAG ATTGAAGGAG ATCAAGGAAG   1380
AGCTTCTGCA TTCTGAGAAG CTTAAGACAT ACTTTGAAGA CAACCCTAGG GACCTCCAGC   1440
TGCTGCGGCA TGACCTACCT TTGCACCCCG CAGTGGTGAA GCCCCACCTG GGCCATGTTC   1500
CTGACTACCT GGTTCCTCCT GCTCTCCGTG GCCTGGTRCG CCCTCACAAG AAGCGGAAGA   1560
AGCTGTCTTC CTCTTGTAGG AAGGCCAAGA GAGCAAAGTC CCAGAACCCA CTGCGCAGCT   1620
TCAAGCACAA AGGAAAGAAA TTCAGACCCA CAGCCAAGCC CTCCTGAGGT TGTTGGGCCT   1680
CTCTGGAGCT GAGCACATTG TGGAGCACAG GCTTACACCC TTCGTGGACA GGCGAGGCTC   1740
TGGTGCTTAC TGCACAGCCT GAACAGACAG TTCTGGGGCC GGCAGTGCTG GGCCCTTTAG   1800
CTCCTTGGCA CTTCCAAGCT GGCATCTTGC CCCTTGACAA CAGAATAAAA ATTTTAGCTG   1860
CCCCAAAAAA AAAAAAAAAA AAAAAAACTC GAGGGGGGGC CCGTACCCAA TTCGCCCTAT   1920
AA                                                                  1922
```

(2) INFORMATION FOR SEQ ID NO: 27:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1951 base pairs
(B) TYPE: nucleic acid

(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 37:

TCGTCCCCAG AGCGGGCTGA GCCCCAGGCG SAGGGTGGCG GGGGAGCCTG GGGGAGCCGC 60

CGCCACCTCC ACGGGCCTCT CTGAGCTCGG ACACCAGCGC CCTGTCCTAT GACTCTGTCA 120

AGTACACGCT GGTGGTAGAT GAGCATGCAC AGCTGGAGCT GGTGAGCCTG CGCCGTGCTT 180

CGGAGACTAC AGTGACGAGA GTGACTCTGC CACCGTCTAT GACAACTGTG CCTCCGTCTC 240

CTCGCCCTAT GAGTCGGCCA TCGGAGAGGA ATATGAGGAG GCCCCGCGGC CCCAGCCCCC 300

TGCCTGCCTC TCCGAGGAAC TCCACGCCTG ATGAACCCGA CGTCCATTTC TCCAAGAAAT 360

TCCTGAACGT YTTCATGAGT GGCCGCTCCC GCTCCTCCAG TGCTGAGTCC TTCGGGCTGT 420

TCTCCTGCAT CATCAACGGG GAGGAGCAGG AGCAGACCCA CCGGGCCATA TTCAGGTTTG 480

TGCCTCGACA CGAAGACGAA CTTGAGCTGG AAGTGGATGA CCCTCTGCTA GTGGAGCTCC 540

AGGCTGAAGA CTACTGGTAC GAGGCCTACA ACATGCGCAC TGGTGCCCGG GGTGTCTTTC 600

CTGCCTATTA CGCCATCGAG GTCACCAAGG AGCCCGAGCA CATGGCAGCC CTGGCCAAAA 660

ACAGTGACTG GGTGGACCAG TTCCGGGTGA AGTTCCTGGG CTCAGTCCAG GTTCCCTATC 720

ACAAGGGCAA TGACGTCCTC TGTGCTGCTA TGCAAAAGAT TGCCACCACC CGCCGGCTCA 780

CCGTGCACTT TAACCCGCCC TCCAGCTGTG TCCTGGAGAT CAGCGTGCGG GGTGTGAAGA 840

TAGGCGTCAA GGCCGATGAC TCCCAGGAGG CCAAGGGGAA TAAATGTAGC CACTTTTTCC 900

AGTTAAAAAA CATCTCTTTC TGCGGATATC ATCCAAAGAA CAACAAGTAC TTTGGGTTCA 960

TCACCAAGCA CCCCGCCGAC CACCGGTTTG CCTGCCACGT CTTTGTGTCT GAAGACTCCA 1020

CCAAAGCCCT GGCAGAGTCC GTGGGGAGAG CATTCCAGCA GTTCTACAAG CAGTTTGTGG 1080

AGTACACCTG CCCCACAGAA GATATCTACC TGGAGTAGCT GTGCAGCCCC GCCCTCTGCG 1140

TCCCCCAGCC CTCAGGCCAG TGCCAGGACA GCTGGCTGCT GACAGGATGT GGCACTGCTT 1200

GAGGAGGGGC ACCTGCCACC GCCAGAGGAC AAGGAAGTGG GGCGCTGGCC CAGGGTAGGG 1260

GAGGGTGGGG CAATGGGGAG AGGCAAATGC AGTTTATTGT AATATATGGG ATTAGATTCA 1320

TCTATGGAGG GCAGAGTGGG CTGCCTGGGG ATTGGGAGGG ACAGGGCTTG GGGAGCAGGT 1380

CTCTGGCAGA GAAGGATGTC CGTTCCAGGA GCACACGGCC CTGCCCCATC CTGGGCCTTA 1440

CCTCCCCTGC CAGGGCTCGG GCGCTGTGGC TCCTGCCTTG ATGAAGCCCG TGTGCTGCCT 1500

TGATGAAGCC TGTGCCACCT GCAAGTGCCC GCCCTGCCCC TGCCCCAACC CCCACCGAAG 1560

AGCCCTGAGC TCAGGCTGAG CCCAGCCACC TCCCAAGGAC TTTCCAGTGA GGAAATGGCA 1620

ACACGTGGAG GTGAAGTCCC TGTTCTCAGC TCCGTCATCT GCGGGGCTTC TGGGTGGCTC 1680

CTGCCACTGA CCTCACCGGC ATGCTGGCCT GTGGCAGGCC TAGGACCTCA GGCGGGGAGG 1740

AGGAGCTGCC GCAAGGCCCT GTCCCAGCAG AAGAGGGAGG CTTCCTGACT GACACAGGCC 1800

AGCCCCATCT TGGTCCTGTC ACCCTGGCCC CAACTATTAA AGTGCCATTT CCTGTCAAAA 1860

AAAAAAAAAA AAAATCGGGG GGGGCCCGGA ANCCAATTTC CCCCAAAAAG GGGGGTTATA 1920

AAAATTCCCN GGCNGTGTTT TTAAAAATTC G 1951

(2) INFORMATION FOR SEQ ID NO: 28:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 3989 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 28:

GGCACAGGCC GCAGGGNACC TATGGGCGCA TATAGGTTGT AATGAAACTG TAGTCTCAGT 60

TGGAAGCCTA GACATGAAAT GGGTCAGTGA GCAAGGCTCT ATTCCTAGTC TCCAGCCATG 120

CCTGTGGAAC CTGARCCCRC TCTCAGCACA TTGGACCCAG GCAGATGYAA AAAATTCACA 180

GAACTATGAT TTGGACTCAA GGGTTTGTAG ATTTCCTCCT TCATTCTAAT TTCAGTGTCT 240

AAAATTCTTG CATCCRTGAA CGAGCTGGGC ATTTGATGAG ACAGGGCYGA ATACTGCAGT 300

TTTCCTCCTA GAAATCATCT GGGGCATTTT CTTTGAACTG ATGGGAACAA TAAGGCATAA 360

CTGTTTGCAC AAACTTGGGA TAARTGATTT TGGGATAACG ATCTACCAGA ATGGGGATAT 420

TTCACCCTTG GTTCTGAGAT GCAAACCAAA GAATATCATG ACCAGCTTTC AGGCCTCCTG 480

AAGTATATCT CTCACATTGT CCTGTTCTCA TGCTGAGGAG CCTGAGATCC CTGTGTGGGG 540

ATTAGACAGT GGACTGTTAT GGGTGTAGGT GAATTGGCTT ATTTTGTCTG TCCCTGTCTG 600

AATGTATTGC AGGAAYTAAA AAGGACCAAG AAGAGGAAGA AGACCAAGGC CCACCATGCC 660

CCAGGCTCAG CAGGGAGCTG CTGGAGGTAG TAGAGCCTGA AGTCTTGCAG GACTCACTGG 720

ATAGATGTTA TTCAACTCCT TCCAGTTGTC TTGAACAGCC TGACTCCTGC CAGCCCTATG 780

GAAGTTCCTT TTATGCATTG GAGGAAAAAC ATGTTGGCTT TTCTCTTGAC GTGGGAGAAA 840

TTGAAAAGAA GGGGAAGGGG AAGAAAAGAA GGGGAAGAAG ATCAAAGAAG GAAAGAAGAA 900

GGGGAAGAAA AGAAGGGGAA GAAGATCAAA ACCCACCATG CCCCAGGCTC AGCAGGGAGC 960

TGCTGGATGA GAAAGRGCCT GAAGTCTTGC AGGACTCACT GGATAGATGT TATTCAACTC 1020

CTTCAGTTGT GTTGAACTGT GTGACTCATG CCAGCCCTAC AGAAGTGCCT TTTATGTATT 1080

GGAGCAACAG CATGTTGGCT TGGCTGTTGA CATGGATGAA ATTGAAAAGT ACCAAGAAGT 1140

GGAAGAAGAC CAAGACCCAT CATGCCCCAG GCTCAGCAGG GAGCTGCTGG ATGAGAAAGA 1200

GCCTGAAGTC TTGCAGGACT CACTGGATAG ATGTTATTCG ACTCCTTCAG GTTATCTTGA 1260

ACTGCCTGAC TTAGGCCAGC CCTACAGCAG TGCKGTTTAC TCATTGGAGG AMCAKTACCT 1320

TGGCTTKKCT CTTGACGTGG ASAAATTGAA AAGAAGGGGA AGGGGAARAA AAGAAGGGGA 1380

AGAAGATCAA AGAAGGAAAG AAGAAGGGGA AGAAAAGAAG GGGAAGAAGA TCAAAACCCA 1440

CCATGCCCCA GGCTCAGCAG GGAGCTGCTG GATGAGAAAG GGCCTGAAGT CTTGCAGGAC 1500

TCACTGGATA GATGTTATTC AACTCCTTCA GGTTGTCTTG AACTGACTGA CTCATGCCAG 1560

CCCTACAGAA GTGCCTTTTA YRTATTGGAG CAACAGYGTG TTGGCTTGGC TGTTGACATG 1620

GATGAAATTG AAAAGTACCA AGAAGTGGAA GAAGACCAAG ACCCATCATG CCCCAGGCTC 1680

AGCAGGGAGC TGCTGGATGA GAAAGAGCCT GAAGTCTTGC AGGACTCACT GGATAGATGT 1740

TATTCGACTC CTTCAGGTTA TCTTGAACTG CCTGACTTAG GCCAGCCCTA CAGCAGTGCT 1800

GTTTACTCAT TGGAGGAACA GTACCTTGGC TTGGCTCTTG ACGTGGACAG AATTAAAAAG 1860

GACCAAGAAG AGGAAGAAGA CCAAGGCCCA CCATGCCCCA GGCTCAGCAG GGAGCTGCTG 1920

GAGGTAGTAG AGCCTGAAGT CTTGCAGGAC TCACTGGATA GATGTTATTC AACTCCTTCC 1980

AGTTGTCTTG AACAGCCTGA CTCCTGCCAG CCCTATGGAA GTTCCTTTTA TGCATTGGAG 2040

GAAAAACATG TTGGCTTTTC TCTTGACGTG GGAGAAATTG AAAAGAAGGG GAAGGGGAAG 2100

AAAAGAAGGG GAAGAAGATC AAMGAAGRAA AGAAGAAGGG GAAGAAAAGA AGGGGAAGAA 2160

GATCAAAACC CACCATGCCC CAGGCTCAAC GGCGTGCTGA TGGAAGTGGA AGAGCSTGAA 2220

GTCTTACAGG ACTCACTGGA TAGATGTTAT TCGACTCCGT CAATGTACTT TGAACTACCT 2280

GACTCATTCC AGCACTACAG AAGTGTGTTT TACTCATTTG AGGAACAGCA CATCAGCTTC 2340

GCCCTTTACG TGGACAATAG GTTTTTTACT TTGACGGTGA CAAGTCTCCA CCTGGTGTTC 2400

CAGATGGGAG TCATATTCCC ACAATAAGCA GCCCTTASTA AKCCGAGAGA TGTCATTCCT 2460

GCAGGCAGGA CCTATAGGCA MGTGAAGATT TGAATGAAAG TACAGTTCCA TTTGGAAGCC 2520

CAGACATAGG ATGGGTCAGT GGGCATGGCT CTATTCCTAT TCTCAAACCA TGCCAGTGGC 2580

AACCTGTGCT CAGTCTGAAG ACAATGGACC CACGTTAGGT GTGACACGTT CACATAACTG 2640

TGCAGCACAT GCCGGGAGTG ATCAGTCRGA CATTTTAATT TGAACCACGT ATCTCTGGGT 2700

AGCTACAAAA TTCCTCAGGG ATTTCATTTT GCAGGCATGT CTCTGAGCTT CTATACCTGC 2760

TCAAGGTCAK TGTCATCTTT GTGTTTAGCT CATCCAAAGG TGTTACCCTG GTTTCAATGA 2820

ACCTAACCTC ATTCTTTGTG TCTTCAGTGT TGGCTTGTTT TAGCTGATCC ATCTGTAACA 2880

CAGGAGGGAT CCTTGGCTGA GGATTGTATT TCAGAACCAC CAACTGCTCT TGACAATTGT 2940

TAACCCGCTA GRCTCCTTTG GTTAGAGAAG CCACAGTCCT TCAGCCTCCA ATTGGTGTCA 3000

GTACTTAGGA AGACCACAGC TAGATGGACA AACAGCATTG GGAGGCCTTA GCCCTGCTCC 3060

TCTCRATTCC ATCCTGTAGA GAACAGGAGT CAGGAGCCGC TGGCAGGAGA CAGCATGTCA 3120

CCCAGGACTC TGCCGGTGCA GAATATGAAC AAYGCCATGT TCTTGCAGAA AACGCTTAGC 3180

CTGAGTTTCA TAGGAGGTAA TCACCAGACA ACTGCAGAAT GTRGARCACT GAGCAGGACA 3240

GCTGACCTGT CTCCTTCACA TAGTCCATRT CACCACAAAT CACACAACAA AAAGGAGARG 3300

AGATATTTTG GGTTCAAAAA AAGTAAAAAG ATAATGTAGC TGCATTTCTT TAGTTATTTT 3360

GARCCCCAAA TATTTCCTCA TCTTTTTGTT GTTGTCATKG ATGGTGGTGA CATGGACTTG 3420

TTTATAGACG ACAGGTCAGC TGTCTGGCTC AGTGATCTAC ATTCTGAAGT TGTCTGAAAA 3480

TGTCTTCATG ATTAAATTCA GCCTAAACGT TTTGCCGGGA ACACTGCAGA GACAATGCTG 3540

TGAGTTTCCA ACCTYAGCCC ATCTGCGGGC AGAGAAGGTC TAGTTTGTCC ATCASCATTA 3600

TCATGATATC AGGACTGGTT ACTTGGTTAA GGAGGGGTCT AGGAGATCTG TCCCTTTTAG 3660

AGACACCTTA CTTATAATGA AGTATTTGGG AGGGTGGTTT TCAAAATTAG AAATGTCCTG 3720

TATTCCRATG ATCATCCTGT AAACATTTTA TCATTTATTA ATCATCCCTG CCTGTGTCTA 3780

TTATTATATT CATATCTCTA CGCTGGAAAC TTTCTGCCTC AATGTTTACT GTGCCTTTGT 3840

TTTTGCTAGT GTGTGTTGTT GAAAAAAAAA ACATTCTCTG CCTGAGTTTT AATTTTTGTC 3900

CAAAGTTATT TTAATCTATA CAATTAAAAG CTTTTGCCTA TCAAAAAAAA AAAAAAAAAA 3960

AAAAAAAAAA AAAAAGCGGA CGCGTGGGC 3989

(2) INFORMATION FOR SEQ ID NO: 29:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 3735 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 29:

CTGCTGTTCG CTGGCTGGGC TCCGCAGCAG GCTTGGCCAG CSGCTGACGG GTCGGCGGGC 60

GGGTTTGTGT GAACAGGCAC GCAGCTGCAG ATTTTATTCT GGTAGTGCAN CCCTCTCAAA 120

GGTTGAAGGA ACTGATGTAA CAGGGATTGA AGAAGTAGTA ATTCCAAAAA AGAAAACTTG 180

GGATAAAGTA GCCGTTCTTC AGGCACTTGC ATCCACAGTA AACAGGATA CCACAGCTGT 240

GCCTTATGTG TTTCAAGATG ATCCTTACCT TATGCCAGCA TCATCTTTGG AATCTCGTTC 300

ATTTTTACTG GCAAAGAAAT CCGGGGAGAA TGTGGCCAAG TTTATTATTA ATTCATACCC 360
CAAATATTTT CAGAAGGACA TAGCTGAACC TCATATACCG TGTTTAATGC CTGAGTACTT 420
TGAACCTCAG ATCAAAGACA TAAGTGAAGC CGCCCTGAAG GAACGAATTG AGCTCAGAAA 480
AGTCAAAGCC TCTGTGGACA TGTTTGATCA GCTTTTGCAA GCAGGAACCA CTGTGTCTCT 540
TGAAACAACA AATAGTCTCT TGGATTTWTT GTGTTACTAT GGTGACCAGG AGCCCTCAAC 600
TGATTACCAT TTTCAACAAA CTGGACAGTC AGAAGCATTG GAAGAGGAAA ATGATGAGAC 660
ATCTAGGAGG AAAGCTGGTC ATCAGTTTGG AGTTACATGG CGAGCAAAAA ACAACGCTGA 720
GAGAATCTTT TCTCTAATGC CAGAGAAAAA TGAACATTCC TATTGCACAA TGATCCGAGG 780
AATGGTGAAG CACCGAGCTT ATGAGCAGGC ATTAAACTTG TACACTGAGT TACTAAACAA 840
CAGACTCCAT GCTGATGTAT ACACATTTAA TGCATTGATT GAAGCAACAG TATGTGCGAT 900
AAATGAGAAA TTTGAGGAAA AATGGAGTAA AATACTGGAG CTGCTAAGAC ACATGGTTGC 960
ACAGAAGGTG AAACCAAATC TTCAGACTTT TAATACCATT CTGAAATGTC TCCGAAGATT 1020
TCATGTGTTT GCAAGATCGC CAGCCTTACA GGTTTTACGT GAAATGAAAG CCATTGGAAT 1080
AGAACCCTCG CTTGCAACAT ATCACCATAT TATTCGCCTG TTTGATCAAC CTGGAGACCC 1140
TTTAAAGAGA TCATCCTTCA TCATTTATGA TATAATGAAT GAATTAATGG GAAAGAGATT 1200
TTCTCCAAAG GACCCGGATG ATGATAAGTT TTTTCAGTCA GCCATGAGCA TATGCTCATC 1260
TCTCAGAGAT CTAGAACTTG CCTACCAAGT ACATGGCCTT TTAAAAACCG GAGACAACTG 1320
GAAATTCATT GGACCTGATC AACATCGTAA TTTCTATTAT TCCAAGTTCT TCGATTTGAT 1380
TTGTCTAATG GAACAAATTG ATGTTACCTT GAAGTGGTAT GAGGACCTGA TACCTTCAGC 1440
CTACTTTCCC CACTCCCAAA CAATGATACA TCTTCTCCAA GCATTGGATG TGGCCAATCG 1500
GCTAGAAGTG ATTCCTAAAA TTTGGAAAGA TAGTAAAGAA TATGGTCATA CTTTCCGCAG 1560
TGACCTGAGA GAAGAGATCC TGATGCTCAT GGCAAGGGAC AAGCACCCAC CAGAGCTTCA 1620
GGTGGCATTT GCTGACTGTG CTGCTGATAT CAAATCTGCG TATGAAAGCC AACCCATCAG 1680
ACAGACTGCT CAGGATTGGC CAGCCACCTC TCTCAACTGT ATAGCTATCC TCTTTTTAAG 1740
GGCTGGGAGA ACTCAGGAAG CCTGGAAAAT GTTGGGGCTT TTCAGGAAGC ATAATAAGAT 1800
TCCTAGAAGT GAGTTGCTGA ATGAGCTTAT GGACAGTGCA AAAGTGTCTA ACAGCCCTTC 1860
CCAGGCCATT GAAGTAGTAG AGCTGGCAAG TGCCTTCAGC TTACCTATTT GTGAGGGCCT 1920
CACCCAGAGA GTAATGAGTG ATTTTGCAAT CAACCAGGAA CAAAAGGAAG CCCTAAGTAA 1980
TCTAACTGCA TTGACCAGTG ACAGTGATAC TGACAGCAGC AGTGACAGCG ACAGTGACAC 2040
CAGTGAAGGC AAATGAAAGT GGAGATTCAG GAGCAGCAAT GGTCTCACCA TAGCTGCTGG 2100

AATCACACCT GAGAACTGAG ATATACCAAT ATTTAACATT GTTACAAAGA AGAAAAGATA 2160
CAGATTTGGT GAATTTGTTA CTGTGAGGTA CAGTCAGTAC ACAGCTGACT TATGTAGATT 2220
TAAGCTGCTA ATATGCTACT TAACCATCTA TTAATGCACC ATTAAAGGCT TAGCATTTAA 2280
GTAGCAACAT TGCGGTTTTC AGACACATGG TGAGGTCCAT GGCTCTTGTC ATCAGGATAA 2340
GCCTGCACAC CTAGAGTGTC GGTGAGCTGA CCTCACGATG CTGTCCTCGT GCGATTGCCC 2400
TCTCCTGCTG CTGGACTTCT GCCTTTGTTG GCCTGATGTG CTGCTGTGAT GCTGGTCCTT 2460
CATCTTAGGT GTTCATGCAG TTCTAACACA GTTGGGGTTG GGTCAATAGT TTCCCAATTT 2520
CAGGATATTT CGATGTCAGA AATAACGCAT CTTAGGAATG ACTAAACAAG ATAATGGCAG 2580
TTTAGGCTGC ACAACTGGTA AAATGACTGT AGATAAATGT TGTAATTAGT GTACACGTTT 2640
GTATTTTTGT TAATATAGCC GCTGCCATAG TTTTCTAACT TGAACAGCCA TGAATGTTTC 2700
ATGTCTCCCT TTTTTTTTTG TCTATAGCTG TTACCTATTT TAGTGGTTGA AATGAGAGCT 2760
AGTGATGACA GAAGGATGTG GAATGTCTTC TTGACATCAT TGTGTATTGC TGGTAATCAA 2820
GTTGGTAACG ACTACTTCTA GCAGCTCTTA CCACTATGAC TTAAGTGGTC CTGGAAGGCA 2880
GTAAGTGGAG GTTTGCAGCA TTCCTGCCTT CATGAGGGCT TCTACCACTG ACCACTTTGC 2940
ACGTACCTGG CTCCCAGATT TACTTAGGTA CCCCACGAGT CGTCCACATA AGCAGCTTCA 3000
TCTTTACCTT GCCAGAGTTG ACAATTATGG GATACTCTAG TCTACTTATA CTTGTGTTCC 3060
CATCTGTCTG CCATCCTCTG AAGGCCAGGA CCCAGTCATA CATCCTTAGA AACCAAAGTA 3120
TGGTTTTTGT TTTCTCTTGG AATGTCAGGT CTTAAGGCAT TTAATTGAGG GACAAAAAAA 3180
AAAAAAAGCC GATATAGTAG CTAGCTACTT AAGCATCCAT GGGTATTGCT CCATATCAAA 3240
GCAGATTTGC AGGACAGAAA GAGTAAATTA GCCTTCAGTC TTGGTTTACA GCTTCCAAGG 3300
AGAGCCTTGG CCACCTGAAA TGTTAACTCG GTCCCTTCCT GTCTCTAGTT CATCAGCACC 3360
TGCAGATGCC TGACTCTTGT TAGCCTTACT ATTCAATACA GTCCTTAGAT TCACGGTATG 3420
CCTCTTCCTA TCCAGGCACC TATTCTGAAT CACCATGTTG CTCTGCAGCT AGAGTTGATA 3480
GGAGAAAATC CATTTGGGTA GATGGCCTAT GAATTTGTAG TAGACTTTCA AAATGAGTGA 3540
TTTGTTAGCT TGGTACTTTT AAGTTTGTGG TACAGATCCT CCAAACCCAT ACTCTGAGCA 3600
ATTAACTGCC TTGAACATAG AGAAAATTAA GGCCTCACAG GATGAGTCTC CATTCTCTGT 3660
AAATGCTTAT TTTATCATAG TCTTTAGCCN CTACTATGAG TAAAATGTTC TCTTCNGCCG 3720
GGTGTGGTGA CTCAC 3735

(2) INFORMATION FOR SEQ ID NO: 30:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1667 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 30:

TAGTAATTCA TTTAACTCCT CTTACATGAG TAGCGACAAT GAGTCAGATA TCGAAGATGA 60
AGACTTAAAG TTAGAGCTGC GACGACTACG AGATAAACAT CTCAAAGAGA TTCAGGACCT 120
GCAGAGTCGC CAGAAGCATG AAATTGAATC TTTGTATACC AAACTGGGCA AGGTGCCCCC 180
TGCTGTTATT ATTCCCCCAG CTGCTCCCCT TTCAGGGAGA AGACGACGAC CCACTAAAAG 240
CAAAGGCAGC AAATCTAGTC GAAGCAGTTC CTTGGGGAAT AAAAGCCCCC AGCTTTCAGG 300
TAACCTGTCT GGTCAGAGTG CAGCTTCAGT CTTGCACCCC CAGCAGACCC TCCACCCTCC 360
TGGCAACATC CCAGAGTCCG GGCAGAATCA GCTGTTACAG CCCCTTAAGC CATCTCCCTC 420
CAGTGACAAC CTCTATTCAG CCTTCACCAG TGATGGTGCC ATTTCAGTAC CAAGCCTTTC 480
TGCTCCAGGT CAAGGAACCA GCAGCACAAA CACTGTTGGG GCAACAGTGA ACAGCCAAGC 540
CGCCCAAGCT CAGCCTCCTG CCATGACGTC CAGCAGGAAG GGCACATTCA CAGATGACTT 600
GCACAAGTTG GTAGACAATT GGGCCCGAGA TGCCATGAAT CTCTCAGGCA GGAGAGGAAG 660
CAAAGGGCAC ATGAATTATG AGGGCCCTGG AATGGCAAGG AAGTTCTCTG CACCTGGGCA 720
ACTGTGCATC TCCATGACCT CGAACCTGGG TGGCTCTGCC CCCATCTCTG CAGCATCAGC 780
TACCTCTCTA GGTCACTTCA CCAAGTCTAT GTGCCCCCCA CAGCAGTATG GCTTTCCAGC 840
TACCCCATTT GGCGCTCAAT GGAGTGGGAC GGGTGGCCCA GCACCACAGC CACTTGGCCA 900
GTTCCAACCT GTGGGAACTG CCTCCTTGCA GAATTTCAAC ATCAGCAATT TGCAGAAATC 960
CATCAGCAAC CCCCCAGGCT CCAACCTGCG GACCACTTAG ACCTAGAGAC ATTAACTGAA 1020
TAGATCTGGG GGCAGGAGAT GGAATGCTGA GGGGGTGGGT GGGGGTGGGA AGTAGCCTAT 1080
ATACTAACTA CTAGTGCTGC ATTTAACTGG TTATTTCTTG CCAGAGGGGA ATGTTTTTAA 1140
TACTGCATTG AGCCCTCAGA ATGGAGAGTC TCCCCCGCTC CAGTTATTGG AATGGGAGAG 1200
GAAGGAAAGA ACAGCTTTTT TGTCAAGGGG CAGCTTCAGA CCATGCTTTC CTGTTTATCT 1260
ATACTCAGTA ATGAGGATGA GGGCTAGGAA AGTCTTGTTC ATAAGGAAGC TGGAGAACTC 1320
AATGTAAAAT CAAACCCATC TGTAATTTCG AGTGGGTGGA GCTCTTGCTT TTGGTACATG 1380
CCCTGAATCC CTCACTCCCT CAAGAATCCG AACCACAGGA CAAAAACCAC CTACTGGGCT 1440
CTCTCCTACC CTGCCCTCCT CCCTTTTTTT TACCCCTCTC TTTTTTATTT TTTCTTTGCT 1500

CTTTAGAACC CAGTGAAAAA TACCAGGGTA CTGGGGTGCA ACTCTTTCTT ATGATAGGTC 1560

ATTAGTGCTT TAAGCAAAAG ATATTAGCAG CTTTGACTGC AGCATTAGCA ATTAGGRAAA 1620

AAAAAAANWA AAAACTCGAG GGGGGGCCCG GTTACCCAAT TCGCCCT 1667

(2) INFORMATION FOR SEQ ID NO: 31:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1408 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 31:

ATTACACACC TGAGCACTGT GCCTGGCAAG ACCTGTCTTA ATAGATTAGA GAACCACTGA 60

TAGATGGTCA GCTTTCTGTA GCAGTGAGAA CCCTACATTT CAAATGTGGA TAGCACCTTT 120

GCGGGGAAAC ATCACTTGGC ACATCTGCAT TCTTTTTTGA CACAGGGTCT CACTCTGTTG 180

CCCAGGCTAG AGTGCATGGC ACGATCTTAG CTCACTGCAA CCTCCACCTC CCAAGTTCAA 240

GCGATTCTTC TGCCTCAGCC TCCTGAGCAG CTGGGATCAC AGACATGCGC TACCATGCCC 300

AGCTAATTTT TTGTATTTTT TGTKTGTTTG TTTTTGTTTK TAAGTAGAGA CGGGCTTTCA 360

CCACGTTGGS CAGGCAGGTC TCGAACTCCT GAMCTCAGGT GATCCACCCA CATCTGCGTT 420

CCAATATCTT TCTCAACATA ATGATAGCCG TAATTAATAT TTTCCAGTAC ATTTTTATGC 480

CTTTACACAC GAGAGTGGTA GACAGACACA AACCCAGATC TGTCTGACTC CAAAGCCCGT 540

TTGTCATCAT TCCTTTTACG GTATCCTATA GTGGTATCCT TTACAGAAAG ACAGCTTTTA 600

CCCAACAAAG ACTTAACTTC CCAGGATGCC AGAAGGACAA AGCGGGATTG CTTTTAAGRA 660

GRAAGTTATC AAGAMCTTAT TTTATAAATG AGATTAGATA GGGAAAGGCA ATTTATCTTT 720

ATTAAAAACT GAAAAGGCCA GCATAGGGAA GGAGGTCCTT CGGTGGTCTT TTTCAGGGAA 780

ATACTTCAGT TGCTTTTATT AGAAACAGAT AGTACCTAAG GTTTTGAGGT AGGWACAGCT 840

TAAGGCATGC TAATGKTCAT GGGTCCTTCC ATAGTCATTT TKGTATTTTG GTTWACATTT 900

GAGCAATAGG CAGCCCTTCA CTGCTGCTGG AYTCATTCCT GCCAYTATTA CAGGTGACAG 960

AGGAGACAGG AGGTATGTCT TTTCTATTTT TAWACATGCT TTATATTTAA CACAAGCTCT 1020

TGGGTATCTT AGATAAACAG AAGTTGCCTA GCACTCCTTT TAGTGCATTG AACCCTTTAA 1080

CATTTAAGCA AAATAATAAA CAGTCTTTTG AGGTTCCTTA ACAATGAAAC GTGTTCGAGT 1140

GGCAGCAGCG GAATCCATGC YTCTTCTCCT GGAGTGTGCA AKAGTCCGTG GTCCTGAGTA 1200

TCTCACACAG ATGTGGCATT TTATGTGTGA TGCTCTAATT AAGGCCATTG GTACAGAACC 1260

AGATTCAGAC GTCCTCTCAG AAATAATGCA TTCTTTTGCA AAGGTGAATA TTTTTCTCTT 1320

AAAAAATATG TATAAGGTGG TATGTTCATT TATTAGTCTT GCTAAAAAAA AAAAAAAAAA 1380

ACTTNGAGGG GGGGNCCGGT ACCCAATT 1408

(2) INFORMATION FOR SEQ ID NO: 32:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2031 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 32:

AGGATATGCA TGATTCTTAA CCAGGCTATA TGTTAAAAAA AAATTGGAAA ATGCAATACA 60

TTTTTTACTA TACAAACTAC AGAATGAGTA TGCAAGTTTT ATTTATCAAA ATGTAATGGA 120

TTTTTAAAGG CTGAGAAATT TTCCTTATAC CTACCTTTTC AGTTATTTTA ATTATACCAA 180

ATTATCAACT AGAATAGCTT CATCCATATG AAATATAAAA TGAAGAGACA CCTAGGCTCT 240

ATCAGGCTTA GGATTCTTTG AACTTATTTC CACTTTAATT TCTCAGTGGA AGTTAAGAGG 300

GGTGAGAAAA CAAAGAAGGG GAAAAACTGA CAACTAACAA AACCAGCACC ACATCGCTAG 360

GTGGTGCTTA CTAATTACCT TCTCAGGATT TTCCTCAGAT TGAAAAGCTT ATGAGGATTT 420

CTTGGGATTC TTAATAACCT GCCTGTTAGT ACAGAGCTTT CCTGATGATA TTTACTCTTG 480

AGCACATGTG GTTGTAAAAC CTTAACTTTC TTTCTCCAGG AGGGTGGTGA TAGAAACAGA 540

TGGTAGTATT TATGAACTGA TGTTCTCGTG AAATGTTGAG GGTGGGGAGA AAAGACTTTA 600

AGGGAGGAGA GCCATCTATT TTGTTCCTAA AGCCACCTCT CAGCAGAATC GTCATGTTTT 660

TCTGATGCAC CGCTCTGCTT CATGCCCAAG ATGACTTGCG AGGCAATCTC AGGAGCTGTG 720

GACTTAACCA TTGCAAAGCA CACTGTCTTT CTCAGCGTTC TCTGCAAGTC AGTAGGTGTT 780

AGTATGGTTG CAAAGTTCAC TGTCTCAGCA AAGTTGAACT GGGCTACCTC TCTACAGCTG 840

TTTCCTCAGA GGGAAAAATC TTGAGACCAG ATGGTGGAGC TCTGGAGTCA GAGGAAATGG 900

GTGTCTTCAG CACAAAGCTG CTGCTTTTAC TTCAGCCACT TCTGACATTT TTACATACCG 960

AGCCTGAGAT TATGTGATTA TCTCAAATCA AATCACTTTG ATGGAGATAA ATAATCAAAA 1020

CTGTTTTATA GTCATTGATT TGGTGAGAAC AGTAATGGAA AATGGTGTTG AAGGACTTCT 1080

CATTTTTGGA GCTTTCCTTC CAGAGTCCTG GCTGATTGGT GTTCGCTGTT CATCTGAGCC 1140

CCCAAAAGCA TTATTACTGA TACTTGCACA CAGTCAAAAG CGCAGACTGG ATGGATGGTC 1200

TTTTATAAGG CATTTAAGGG TACACTACTG TGTTTCACTG ACCATACATT TTTCTTAGCC 1260

CCTCAAGTAA TATAGCACAG AGTTATGAAT GACAATTCCC CTAACCATTC CTCTTCATAT 1320

CTGCCTCTTC CCCTTACCAT CGTAATTCTC CAAACTGGTC ATAAAGGCAC TCTGTGAAGA 1380

TATTGGGGAC TGACATCTTA AGCTCTCACC TGGCTGCAGT AGGAAAGGCC AAACTGACGA 1440

CAAAAAAAAA ATTCTTTATA AAGATGATAT GGTAACATGT ATCTTTGCCC TGGGTCTGGG 1500

TGGGTCCAGT CAGTCTCAGA TTTACAAGCA TTTAGGAGCC TAGGTAAAAG CTGCTAGTAT 1560

TCTTTTAAAA GTTACATTTA TGACTTGCAA TGATAGAAAA CTCCTTCCAA TTAAATGGCA 1620

TTTTATAATA TTATGTGTGT ACTTCACAGT GTTAAAAATA CCCTCATACG TTATTGCATT 1680

TGATCTTCAC AGAAAGTGCA TTTTAACCAG TACTCTGGGT GCAATAAATA ATATGTAGAA 1740

ATTTAAGTCC TCCAATTCCA GCATATCCAG TGAGTTTTGA CAGTGTGTTT ATGTGGAATG 1800

TTTAAGGATA TACAATTGTA CTTTATATAA ATTGGTTCTT GTTCTTCTTA AATGTGACAT 1860

GAAATAATTG TGCTGCTACA TTATACTGGA AATTAACAGG GGAAAAGGGA AGAGCTCTTG 1920

GCTCCCTTGA GGTTCTGCTA GTGGTGTTAG GAGTGGTTAC AACTGAGCTT TTAGTAACCA 1980

TTTAACCGTA TGTAAACTTG GTTTCTAATT AAAAAAAAAT TTCTTTTTCC A 2031

(2) INFORMATION FOR SEQ ID NO: 33:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 971 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: double

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 33:

CGCGTCGGAA CTCGGCCGCG GGACATCCAC GGGGCGCGAG TGACACGCGG GAGGGAGAGC 60

AGTGTTCTGC TGGAGCCGAT GCCAAAAACC ATGCATTTCT TATTCAGATT CATTGTTTTC 120

TTTTATCTGT GGGGCCTTTT TACTGCTCAG AGACAAAAGA AAGAGGAGAG CACCGAAGAA 180

GTGAAAATAG AAGTTTTGCA TCGTCCAGAA AACTGCTCTA AGACAAGCAA GAAGGGAGAC 240

CTACTAAATG CCCATTATGA CGGCTACCTG GCTAAAGACG GCTCGAAATT CTACTGCAGC 300

CGGACACAAA ATGAAGGCCA CCCCAAATGG TTTGTTCTTG GTGTTGGGCA AGTCATAAAA 360

GGCCTAGACA TTGCTATGAC AGATATGTGC CCTGGAGAAA AGCGAAAAGT AGTTATACCC 420

CCTTCATTTG CATACGGAAA GGAAGGCTAT GCAGAAGGCA AGATTCCACC GGATGCTACA 480

TTGATTTTTG AGATTGAACT TTATGCTGTG ACCAAAGGAC CACGGAGCAT TGAGACATTT 540

AAACAAATAG ACATGGACAA TGACAGGCAG CTCTCTAAAG CCGAGATAAA CCTCTACTTG 600

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CAAAGGGAAT TTGAAAAAGA TGAGAAGCCA CGTGACAAGT CATATCAGGA TGCAGTTTTA    660
GAAGATATTT TTAAGAAGAA TGACCATGAT GGTGATGGCT TCATTTCTCC CAAGGAATAC    720
AATGTATACC AACACGATGA ACTATAGCAT ATTTGTATTT CTACTTTTTT TTTTTAGCTA    780
TTTACTGTAC TTTATGTATA AAACAAAGTC ACTTTTCTCC AAGTTGTATT TGCTATTTTT    840
CCCCTATGAG AAGATATTTT GATCTCCCCA ATACATTGAT TTTGGTATAA TAAATGTGAG    900
GCTGTTTTGC AAACTTAAAA AAAAAWWAAA AAAACTSGAG GGGGGCCCGT ACCCAANTCG    960
CCGNATATGA T                                                         971
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(2) INFORMATION FOR SEQ ID NO: 34:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1792 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 34:

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GAACCCCCTT TCTCCTGGTA AAGGGTAAGG GGGGGGATAA TGTTTACCAC AGGTACGAAA     60
TAGTCACTTT AACATTGAGA CCTCTGCCTC ATTGAATTCA GGTTTTTTAA GTACTTGAAA    120
CTCTTCAGAT TCTCCTTATT TTAGTTTCTT TTTACATTTA TGAAGTAGAA AGCATTGTTT    180
TGTAAACTGT TTTGAAAATA AATAGCCTAG TCTCTTATCC TCTTTAGCGT GGATTAAAGG    240
TGAAGTTCTG CAAATGGGAG AGTGTTCACA GTAGATAGCT CAGATTGATT GAACACATTT    300
GAGGAAGAGA CTCCTGCATG AGATACCAGC ATTTTTACAA ATACTTTTTA TGTACATTCT    360
TTATTTTGTC ATTTTGTCAA CCCTCTCCCC AAGCACATCT TCTTTCCTTT TACTATGTCT    420
ATGTAGGGAA AAACAAAACA AAAAATTGCA CTTACGTTAC ACTCCCAAAA TGTGGGTAAT    480
CCGTGTCTTT CAAAAAACAT TTCTGTTTTT TGTTTTGTTT TGGTCAGTCC ATTGCATAAG    540
TGACAAGTTT GGGTGCTTGT GGCACGTATG TATGAAGCGG GAGGGGGATG ASAATTGCCT    600
GTCCTTCAGT ARGCTGTAAA AGTAATTTAC ATGTAAGTAA AAAGGGAAAA TAGAATAGAT    660
GCCAAAGTCA TTTATTCAGT CCTTAGTTTT CTTATGTGGC ATTACTGCAT CTGCTAGTTA    720
GTGAGAAAGC ACCCTCAGCT TTTACTGCTC CCCTCCCTGC CTGCCAACAC ACTTGATGTG    780
TGCAAACAGC CCTCAAGTAT CTGTCAGATG ACCTATATAA GGTATTGAAT AAGGTATTCT    840
TGTCAGTTTA GAAATGGACT GGATAAAACT TACTTGGTTG TCATTATTTT ATCTCATTTG    900
TCCTGTTACA TGCCCTATGT TAAGATAATT ATATTGCCAC TAATAATCAA GATGCTAAAT    960
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GAGTATTACA ACTGGCTAAT ATCATTTTTT ATATACAAGG GTATGTGTAT ATTTGGAATT 1020

GRTATGAGAA ACTCATTTGT ACCCATTTGA GTGATATTGC ACAACAAACA CAGATAYCTA 1080

CAGACTCCGT TTTCATTTTC TCGTGTTCTT TATGATAATG ATCTTTGTAG ATTGGTTATT 1140

TCTGTACTTT ATCTGTAATA AACTTTGTAG ATCCTGTGAA CCATTACTTT GCCTAAATCA 1200

CTTGAGACTT GAGTCTTTAA TAACAAAGCA TCAATATTCA CTAAAGTCAA TCTCTTTTGA 1260

GTTTCTGTGA CTTGGCTAGA AGCTCTTGAC ACTAAGGGAT TAGTGTTAAT TTTCCCTGGG 1320

GGTGTTCCAC TAGGGCATTA CTGTATAATG ACTTGATGTT GCCACATAGA CTTCAAGATA 1380

TATAATATTT TGAGGATTTT GTTGATTGGC CTATGTTTTA TTGCATAGTG TGAAACGTGT 1440

AAAGCTTGGT TAACCTGTAT ATAGATAGCT TATTGTTGAC TAGTTATAGT GTATTTAGGG 1500

TTGCCTGTAA TATTTAAGCT TCTTTACTGA TGTGTGTGCT GGTAGGAACA TATAATTTTT 1560

GTACATTATA TTTACTGAGA TGTTGCCTTT TTTATTTTAC AAATACTTTG GAATTCCAAT 1620

GTGTTTTTTG CTTCCGTGAG GATTAATTTG GAAAGGTTTT TAATGACATT CCACTGATTT 1680

CAGATTTTGC TTGAGATTGA CTTCAATAAA TTGTCCTGTA TGTTCCAAAA AAAAATTAAA 1740

AAACTCGAGG GGGGCCCGGT ACCCAANNCG CCGGATATGA TCGTAAACRA TC 1792

(2) INFORMATION FOR SEQ ID NO: 35:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 896 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 35:

AGTTGNANAC AACAGGACCT GAGTCCTTGG GCAGCACCAG TAGGTTGCCC CYTGCYTCYT 60

GCCAGCYTCA CYTGCCACYT TYTGCCCCTY TCGGGATGCC TTCGCAGACA GAGYTYTTCG 120

CTGCCTGTGG TGGCCAYTCT TTGCTTTTGG TTYTCTTGCC CCTTGGCCTC CCTTTTTGTC 180

CCCGGGCAGC CTTGTGTGAC CTGCCCTTTT CCCTCCCTTC CTTTCCAGGA CAAGCACGCC 240

GAGGAGGTGC GGAAAAACAA GGAGCTGAAG GAAGAGGCCT CCAGGTAAAG CCTAGAGGCC 300

AAAGAACTTT CCAGGTCAGC CGGACAGCTC CAGCAGCTCC ACGTTCCAGG CAGCCTCGMC 360

CGCCGGCTGC GCTCCCAGCA CTGGGGTTTG GGGGGAGGGG GGTGGCCAAG GGGCGTTTCC 420

TCTGCTTTTG GTGTTTGTAC ATGTTAAGAA TTGACCAGTG AAGCCATCCT ATTTGTTTCC 480

GGGGAACAAT GACGGGGTGG GARAGGGGAG AGGAGAGAGT TTGGGAAAGG GAGATGGAGA 540

AGAACTCAAG GACATTGCAA CCCTGCCCGG CGCAGATCTG ATTTTCACAT CTCTACCTGG 600

ACATTGAGCC TCCCAGGCAC CATGTTGAGG AGAGATGAAA ACCAGGGCGG TAGAACTTCA 660

GGGTGAAGGA CAGAGTCCTG GGTGGGGCAG CGGCTGCAGG GCGCACCAGA GAACCCAGCC 720

AGAGGGGGTG TGAGTACCAG TGGTGTTGCT TCCACCCTGC AGCAGGTGGG ATGAGGTCTG 780

TGTGTGTGTG TGAACCATCA TTTTTTGATC ATCATGACCA ATGAAACATT GAAAAAAAAA 840

AAAAAAACTG GAGGGGGGCC CGTACCCAAN TCGCCGNATA GTGATCGTAA ACAATC 896

(2) INFORMATION FOR SEQ ID NO: 36:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 912 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 36:

TCGACCCACG CGTCCGGTCA GCCAGTCGCA TCCAGCCATG ACAGCCTTCT GCTCCCTGCT 60

CCTGCAAGCG CAGAGCCTCC TACCCAGGAC CATGGCAGCC CCCCAGGACA GCCTCAGACC 120

AGGGGAGGAA GACGAAGGGA TGCAGCTGCT ACAGACAAAG GACTCCATGG CCAAGGGAGC 180

TAGGCCCGGG GCCAKCCGCG GCAGGGCTCG CTGGGGTCTG GCCTACACGC TGCTGCACAA 240

CCCAACCCTG CAGGTCTTCC GCAAGACGGC CCTGTTGGGT GCCAATGGTG CCCAGCCCTG 300

ARGGCAGGGA AKGTCAACCC ACCTGCCCAT CTGTGCTGAG GCATGTTCCT GCCTACCATC 360

CTCCTCCCTC CCCGGCTCTC CTCCCAGCAT CACACCAGCC ATGCAGCCAG CAGGTCCTCC 420

GGATCACYGT GGTTKGGTGG AGGTCTGTCT GCACTGGGAG CCTCARGARG GCTCTGCTCC 480

ACCCACTTGG CTATGGGAGA GCCAGCAGGG GTTCTGGAGA AAAAAACTGG TGGGTTAGGG 540

CCTTGGTCCA GGAGCCAGTT GAGCCAGGGC AGCCACATCC AGGCGTCTCC CTACCCTGGC 600

TCTGCCATCA GCCTTGAAGG GCCTCGATGA AGCCTTCTCT GGAACCACTC CAGCCCAGCT 660

CCACCTCAGC CTTGGCCTTC ACGCTGTGGA AGCAGCCAAG GCACTTCCTC ACCCCYTCAG 720

CGCCACGGAC CTYTYTGGGG AGTGGCCGGA AAGCTCCCSG GCCTYTGGCC TGCAGGGCAG 780

CCCAAGTCAT GACTCAGACC AGGTCCCACA CTGAGCTGCC CACACTCGAG AGCCAGATAT 840

TTTTGTAGTT TTTATKCCTT TGGCTATTAT GAAAGAGGTT AGTGTGTTCC CTGCAATAAA 900

CTTGTTCCTG AG 912

(2) INFORMATION FOR SEQ ID NO: 37:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1382 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 37:

```
AATTCGGCAC GAGCGGAGGC GAGGGAAACT RAGGCGCAAA GTTGTGTGTC GTGTTGGCAG     50
GAGGGCCTAG AAGGGAAAGA CTGTCTAGTG GGACAATGTC ATATTATAAA TTTGGAATGC    120
TGAATAGAAA ATTATAGATT TTGATATTGA AGGAAATGAA GCGAAGCYTA AATGAAAATT    180
CAGCTCGAAG TACAGCAGGC TGTTTGCCTG TTCCGTTGTT CAATCAGAAA AAGAGGAACA    240
GACAGCCATT AACTTCTAAT CCACTTAAAG ATGATTCAGG TATCAGTACC CCTTCTGACA    300
ATTATGATTT TCCTCCTCTA CCTACAGATT GGGCCTGGGA AGCTGTGAAT CCAGAGTTKG    360
CTCCTGTAAT GAAAACAGTG GACACCGGGC AAATACCACA TTCAGTTTCT CGTCCTCTGA    420
GAAGTCAAGA TTCTGTCTTT AACTCTATTC AATCAAATAC TGGAAGAAGC CAGGGTGGTT    480
GGAGCTACAG AGATGGTAAC AAAAATACCA GCTTGAAAAC TTGGRATAAA AATGATTTTA    540
AGCCTCAATG TAAACGAACA AACTTAGTGG CAAATGATGG AAAAAATTCT TGTCCAATGA    600
GTTCGGGAGC TCAACAACAA AAACAATTAA GAACACCTGA ACCTCCTAAC TTATCTCGCA    660
ACAAAGAAAC CGAGCTACTC AGACAAACAC ATTCATCAAA AATATCTGGC TGCACAATGA    720
GAGGGCTAGA CAAAAACAGT GCACTACAGA CACTTAAGCC CAATTTTCAA CAAAATCAAT    780
ATAAGANACA AATGTTGGAT GATATTCCAG AAGACAACAC CCTGAAGGAA ACCTCATTGT    840
ATCAGTTACA GTTTAAGGAA AAAGCTAGTT CTTTAAGAAT TATTTCTGCA GTTATTGAAA    900
GCATGAAGTA TTGGCGTGAA CATGCACAGA AAACTGTACT TCTTTTTGAA GTATTAGCTG    960
TTCTTGATTC AGCTGTTACA CCTGGCCCAT ATTATTCGAA GACTTTTCTT ATGAGGGATG   1020
GGAAAAATAC TCTGCCTTGT GTCTTTTATG AAATCGATCG TGAACTTCCG AGACTGATTA   1080
GAGGCCGAGT TCATAGATGT GTTGGCAACT ATGACCAGAA AAAGAACATT TTCCAATGTG   1140
TTTCTGTCAG ACCGGCGTCT GTTTCTGAGC AAAAAACTTT CCAGGCATTT GTCAAAATTG   1200
CAGATGTTGA GATGCAGTAT TATATTAATG TGATGAATGA AACTTAAGTA GTGATAAAAG   1260
GAAGTTTAGC ATAAATTATA GCAGTTTTCT GTTATTGCTT AATTTACCAT CTCCATAGTT   1320
TTATAGCTAC TATTGTATTT CACTTGTTGA ATTAAAGTAT TTGAATTCTT TTAAAAAAAA   1380
AA                                                                  1382
```

(2) INFORMATION FOR SEQ ID NO: 38:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 872 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 38:

```
GGGCTACTTC AAAGCCCTGG GCCTTATTTC TTCAGGTAAA AAAATATAAA GTCAGATCTC     60
ATCCCGGCTG GCCATGCTGT TAGACCCTTT CATCCTTCTC TTCTGCCTCT TCTCAACAGC    120
TGCCCAGTCC TGTTTGGAAT TCATATACAT ACAGTTCTAA TACTGATGTA TTTACCCTCA    180
TAAGCCACTC AACCCAGAAT CTTATTTGAA TTATAATCCA GAAACATCAG GTGACGTGTG    240
AGACTACTGT ATGAGAAAGA GACAGTTTAA GGGTCAGTCC AATGGAAAAA AGAGTTCTCA    300
GAGCTTTCTT TAGCTTATTC TCATCAAAGA GCTTTCTCTG CAGAAGGAAC CTACTGGTTC    360
CTCCTTTCCA GTCCTAGAAA TCCTGACCTA GAGTGGCTTA ATCCTGCTAG CACCTCTCTC    420
TCGCACTCTG GTGCCAAATG ACTCCAGGAA CTGGGCCATG ATGTGGTGGG AATGACCTTA    480
CCCTGAGCAT GTCACTCATG CATTGAACAA CAGCTAAGAG CAGAGCTTAG AGCTTAGAGC    540
TGGGCCCTGT AAGGTGAGAG GAATCACATC CTGCAGAAGT CTGTCCTGAG AAGCAGGTAC    600
TCCTGTCACA GCAGAGACAC AGTGGATACC TGAGTAACAA TAATACAAGA CAGGACGTGG    660
GMACAGCAAA AGATTTGGGT GTCAGAAGAR GCCGAGAACA CTTYCAGGCA GGAACATTCA    720
RARTTGTTCT TGGAGGAART AGGCMCSAAG GCTGGGCAGG ATTTCMCGGG GCAGAGATGG    780
AGCAAGCAAT TGAAATGAAA GCCATGGCAT GGGAAAAGGA GCACTGGCCA CAGGGAGTGC    840
AACGTTGTGA TGCAAGGCCA CTGTGGAGCC AT                                  872
```

(2) INFORMATION FOR SEQ ID NO: 39:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 812 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 39:

```
GGCAGAGGCT CACCCCAGCA GAGATTGAGG GGGAACCGTG ATGAAATTTT TAAGTATTCT     60
GCTTGATGAT AATAATTTTY CTCTTATGTT AATGTTGGCT CCGTTTGGGT GTTTAGCTTT    120
TGAAAGGAGT ATGAAAATGC GGAATGGGGC TTTGGGGCTT GAGGAGGTGT GATCTCTAGT    180
GTTTAAAAAA TTTAATTGCA CAAATAGAAA TAATTCACCC ACATTATTGA ACCCCACTAA    240
```

AGCATATCCT TTTTGTCCAT ATTCCTTTCC TGCTGCCCTC GTGTGTACCA TTATTACTCA 300

GTTGTGATTT GAGCTCGTTC CACTTAAAGT CATTCATAGA TACTTTTGCG TCGTGTTKGA 360

ATATTTATTG AATTTCTATT CTGTGTTTTA CTTAATTACT TTATTATGGA ACCTTTACAC 420

AGGTCTGGTG TACTTGTTCT TTGAAAAGTC TTATGTTGAC CACCATCACT GAGCATATAG 480

CTTTTTCCTT ATTTCCTTGG GATAATTACC CGAAGTGGAA ATACCGAATC AAACTTCTGT 540

TTTCTTTCTT TGGCACTATT ATATAAATTG TTTTCCAAAC AAGGCATGTT TACAATAGAC 600

ATTTTTCAAA ATCTGGGTAT TTGTCCTATT TTGCTCTCTG TATGCAGAAT TCAGCGGGGT 660

GCCAAGTCGT TTTCTGTGTG GGTTGAGAGA CAGGCTGTGC AGCCCACTGT TGCATAGGAC 720

TAACTACTAC AAATCATGCT GAGACCGAGC TATTTTTGCT GCTTAGARGC TTTGCAGCCT 780

TGAGTAAGTT TCGNCATCTG GAAACNTTGN AA 812

(2) INFORMATION FOR SEQ ID NO: 40:

(i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 1515 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 40:

AATTCGGCAC GAGGGAAATT CAAGCACTTT TCCTAAAAGA AGGGGGAATG GATGCTGAAA 60

CAACACGTNT CCCACAAAGG GAGCAGACAC TGGGCTTGTG AAGCTGCCCC ATACCTTCCC 120

CACAGAACTG GGGTCCGGCC TCCCTGACAT GCAGATTTCC ACCCAGAAGA CAGAGAAGGA 180

GCCAGTGGTC ATGGAATGGG CTGGGGTCAA AGACTGGGTG CCTGGGAGCT GAGGCAGCCA 240

CCGTTTCAGC CTGGCCAGCC CTCTGGACCC CGAGGTTGGA CCCTACTGTG ACACACCTAC 300

CATGCGGACA CTCTTCAACC TCCTCTGGCT TGCCCTGGCC TGCAGCCCTG TTCACACTAC 360

CCTGTCAAAG TCAGATGCCA AAAAAGCCGC CTCAAAGACG CTGCTGGAGA AGAGTCAGTT 420

TTCAGATAAG CCGGTGCAAG ACCGGGGTTT GGTGGTGACG GACCTCAAAG CTGAGAGTGT 480

GGTTCTTGAG CATCGCAGCT ACTGCTCGGC AAAGGCCCGG GACAGACACT TTGCTGGGGA 540

TGTACTGGGC TATGTCACTC CATGGAACAG CCATGGCTAC GATGTCACCA AGGTCTTTGG 600

GAGCAAGTTC ACACAGATCT CACCCGTCTG GCTGCAGCTG AAGAGACGTG GCCGTGAGAT 660

GTTTGAGGTC ACGGGCCTCC ACGACGTGGA CCAAGGGTGG ATGCGAGCTG TCAGGAAGCA 720

TGCCAAGGGC CTGCACATAG TGCCTCGGCT CCTGTTTGAG GACTGGACTT ACGATGATTT 780

CCGGAACGTC TTAGACAGTG AGGATGAGAT AGAGGAGCTG AGCAAGACCG TGGTCCAGGT 840

GGCAAAGAAC CAGCATTTCG ATGGCTTCGT GGTGGAGGTC TGGAACCAGC TGCTAAGCCA 900

GAAGCGCGTG ACCGACCAGC TGGGCATGTT CACGCACAAG GAGTTTGAGC AGCTGGCCCC 960

CGTGCTGGAT GGTTTCAGCC TCATGACCTA CGACTACTCT ACAGCGCATC AGCCTGGCCC 1020

TAATGCACCC CTGTCCTGGG TTCGAGCCTG CGTCCAGGTC CTGGACCCGA AGTCCAAGTG 1080

GCGAAGCAAA ATCCTCCTGG GGCTCAACTT CTATGGTATG GACTACGCGA CCTCCAAGGA 1140

TGCCCGTGAG CCTGTTGTCG GGGCCAGGTA CATCCAGACA CTGAAGGACC ACAGGCCCCG 1200

GATGGTGTGG GACAGCCAGG YCTCAGAGCA CTTCTTCGAG TACAAGAAGA GCCGCAGTGG 1260

GAGGCACGTC GTCTTCTACC CAACCCTGAA GTCCCTGCAG GTGCGGCTGG AGCTGGCCCG 1320

GGAGCTGGGC GTTGGGGTCT CTATCTGGGA GCTGGGCCAG GGCCTGGACT ACTTCTACGA 1380

CCTGCTCTAG GTGGGCATTG CGGCCTCCGC GGTGGACGTG TTCTTTTCTA AGCCATGGAG 1440

TGAGTGAGCA GGTGTGAAAT ACAGGCCTTC ACTCCGTTAA AAAAAAAAAA AAAAAAAAAA 1500

AAAAAAAAAA AAAAA 1515

(2) INFORMATION FOR SEQ ID NO: 41:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 704 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 41:

AAGATGGTGG CGCCCAGAGC TTCGCTCTAT GCTGCTCCCC TGAGAGAGGC GTTTCCATCA 60

ACCAGTTTTG CAAGGAGTTC AATGAGAGGA CAAAGGACAT CAAGGAAGGC ATTCCTCTGC 120

CTACCAAGAT TTTAGTGAAG CCTGACAGGA CATTTGAAAT TAAGATTGGA CAGCCCACTG 180

TTTCCTACTT CCTGAAGGCA GCAGCTGGGA TTGAAAAGGG GGCCCGGCAA ACAGGGAAAG 240

AGGTGGCAGG CCTGGTGACC TTGAAGCATG TGTATGAGAT TGCCCGCATC AAAGCTCAGG 300

ATGAGGCATT TGCCCTGCAG GATGTACCCC TGTCGTCTGT TGTCCGCTCC ATCATCGGGT 360

CTGCCCGTTC TCTGGGCATT CGCGTGGTGA AGGACCTCAG TTCAGAAGAG CTTGCAGCTT 420

TCCAGAAGGA ACGAGCCATC TTCCTGGCTG CTCAGAAGGA GGCAGATTTG GCTGCCCAAG 480

AAGAAGCTGC CAAGAAGTGA CCCTTGCCCC ACCAACTCCC AGATTTCAAA GGAGGTAGTT 540

GCAAAAGCTG TGCCCAAGGG GAGGAAGGAG GTCACACCAA TATGATGATG GTTTTCATGA 600

CTTTGAATGA TATATTTTTG TACATCTAGC TGTATCGAGG CATCAGGCCT GAATAAACAT 660

CCTTTCTTAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAA 704

(2) INFORMATION FOR SEQ ID NO: 42:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1094 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 42:

GGCAGCTTTC TTACAAACCC ATCCTTCTGA AATGTTGCTT CAAATTCATC CTCTGCTCCC 60
CAGTCCCACT ATTCCACACA TACTGTTACT GTTTCTTTAT CCTACTTTCT CAATTTTGGA 120
ACATAGTTGC AGTTACTGCA TTGAATACCT GTGGGTTTGC CTGTTGTTCT GTCTGTCTCT 180
GTGGTTCTTG TAATANTGGA TCCCAGAGAT AAAATGGACA GTTGTNATGC ACAGTTAATT 240
CAGAAACTAG ACCTTACTTG CTGTGTGAAA TACCAACTAA ATTCTCAGTG AACTCAGCTG 300
ANCTTTATCT CCTTTTGTTT CCCCAATTTA TAATTTCAGT TCAGGCCCAG AAAGATGGAA 360
TCCCAGCTAA GAAATACAAG TTACACCCTG TACTAGCAGC CCATGTGTGC ATGTTCTTTA 420
AGTGCTCTTG CAGCTATGTC ATTTATATTG ATTTCCCTGT ATTATTATAA GCAAAGCAAA 480
TTTGAGGAAA AAAACCCATA ATACCACACC TCATTTTTTT CAAGTAATAG GGTCATAAGT 540
CTCATYCTYC ATATAATATG TTGAGTATGC AGTATATTAT GTGTTAGGCT CTGGANAGGC 600
AGAGGTTAGA TCATGTWACA GATCATATCK GATTAGGCAG ATAAACAGTA TTTTAACCTT 660
TTCCTTATTA TATGTAACTT GCTTTCAGGT TTTTTAATGT TACTATTATG TCTTTAATAT 720
ATTATCTTTA TTTGTACTTT TGTATACAGA GTGATTTTCC TTTTTTAAAA AAAATTGTGT 780
CTTTAGGATG GATTCCAAAG ATGTGGAATC AGTAGGTTTA AGGAATATGG ATATTTTGGC 840
TGGCAAGGTG GCTCACACCT GTAATCCCAG CACTTTGGGA GGCTGAGGTG GGTGGATCAC 900
CTGAAGTCAG GAGTTCGAGA CCAGCCTGAC CAACATGGCG AAACCCTGTT TNTACTAAAG 960
ACACACWWAA AATTRGCCAG TGGTGGTGGC ATGTGCTTGT AGTCCCACTT AGCTACTCGA 1020
GAGGCTGAGG CAGGAGAATC GCTTGAACCC GGGAGGCAGA GGTTGCAGTG AGGCAAGATG 1080
GCACCTCTAC ACTC 1094

(2) INFORMATION FOR SEQ ID NO: 43:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 1821 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 42:

```
TGGCTTAGGC CATCACCCTT CCCTTGGCTG GAACTACTGG ACAGACCCTT TTGAGATGTG    60
CCTGTGGTGC TGTGGAGATG TGTGTAGTGG TCTTAGCTCT TTGTTGAGCT TGTGTGTGTG   120
TTGTGTAGTC TTAGCTGTAT GCTGAAATTG GCCGTGTGTT GGAGGGCTTC TTAGCTCTTT   180
GGTGAGATTG TATTTCTATG TGTTTGTATC ASCTGAATGT TGCTGGAAAT AAAACCTTGG   240
TTTGTMAAGG CTCTTTTTTG TGGGAAGTAA GTAGGGGAAA AGGTCTTTGA GGGTTCCTAG   300
GCTCCTTTGT ACAACAGGAA AATGCCTCAA AGCCTTGCTT CCCAGCAACC TGGGGCTGGT   360
TCCCAGTGCC TGGTCCTGCC CCTTCCTGGT TCTTATCTCA AGGCAGAGCT TCTGAATTTC   420
AGGCCTTCAT TCCAGAGCCC TCTTGTGGCC AGGCCTTCCT TTGCTGGAGG AAGGTACACA   480
GGGTGAAGCT GATGCTGTAC TTGGGGGATC TCCTTGGCCT GTTCCACCAA GTGAGAGAAG   540
GTACTTACTC TTGTACCTCC TGTTCAGCCA GGTGCATTAA CAGACCTCCC TACAGCTGTA   600
GGAACTACTG TCCCAGAGCT GAGGCAAGGG GATTTCTCAG GTCATTTGGA GAACAAGTGC   660
TTTAGTAGTA GTTTAAAGTA GTAACTGCTA CTGTATTTAG TGGGGTGGAA TTCAGAAGAA   720
ATTTGAAGAC CAGATCATGG GTGGTCTGCA TGTGAATGAA CAGGAATGAG CCGGACAGCC   780
TGGCTGTCAT TGCTTTCTTC CTCCCCATTT GGACCCTTCT CTGCCCTTAC ATTTTTGTTT   840
CTCCATCTAC CACCATCCAC CAGTCTATTT ATTAACTTAG CAAGAGGACA AGTAAAGGGC   900
CCTCTTGGCT TGATTTTGCT TCTTTCTTTC TGTGGAGGAT ATACTAAGTG CGACTTTGCC   960
CTATCCTATT TGGAAATCCC TAACAGAATT GAGTTTTCTA TTAAGGATCC AAAAAGAAAA  1020
ACAAAATGCT AATGAAGCCA TCAGTCAAGG GTCACATGCC AATAAACAAT AAATTTTCCA  1080
GAAGAAATGA AATCCAACTA GACAAATAAA GTAGAGCTTA TGAAATGGTT CAGTAAGGAT  1140
GAGTTTGTTG TTTTTTGTTT TGTTTTGTTT TGKTTTTTTA AAGACGGAGT CTCGCTCTGT  1200
CACTCAGGCT GGAGTGCAGT GGTATGATCT TGGCTCACTG TAACCTCCGC CTCCCGGGTT  1260
CAAGCCATTC TCCTGCCTCA GTCTCCTGAG TAGCTGGGAT TACAGGTGCG TGCCACCATG  1320
CCTGGCTAAT TTTTGTGTTT TTAGTAGAGA CAGGGTTTCA CCATGTTGGT CGGGCTGGTC  1380
TCAAACTCCT GACCTCTTGA TCCGCCTGCC TTGGCCTCCC AAAGTGATGG GATTACAGAT  1440
GTGAGCCACC CGTGCCGTAG CCAAGGATGA GATTTTTAAA GTATGTTTCA GTTCTGTGTC  1500
ATGGTTGGAA GACAGAGTAG GAAGGATATG GAAAAGGTCA TGGGGAAGCA GAGGTGATTC  1560
ATGGCTCTGT GAATTTGAGG TGAATGGTTC CTTATTGTCT AGGCCACTTG TGAAGAATAT  1620
```

GAGTCAGTTA TTGCCAGCCT TGGAATTTAC TTCTCTAGCT TACAATGGAC CTTTTGAACT 1680

GGAAAACACC TTGTCTGCAT TCACTTTAAA ATGTCAAAAC TAATTTTTAT AATAAATGTT 1740

TATTTTCACA TTGAAAAAAA AAAAAAATTT AAAAACYCGG GGGGGGCCCS GWACCCCATT 1800

NGCCCCTAAG GGGGGGGGTT T 1821

(2) INFORMATION FOR SEQ ID NO: 44:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1024 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 44:

GGGGCACAGT TGAAGAAGCG ACCGAGGGAC TGGGAGTCGT TAGTGAGGAT GACGCGGCAT 60

GGCAAGAACT GCACCGCAGG GCCGTCTACA CCTACCACGA GAAGAAGAAG GACACAGCGG 120

CCTCGGGCTA TGGGACCCAG AACATTCGAC TGAGCCGGGA TGCCGTGAAG GACTTCGACT 180

GCTGTTGTCT CTCCCTGCAG CCTTGCCACG ATCCTGTTGT CACCCCAGAT GGCTACCTGT 240

ATGAGCGTGA GGCCATCCTG GAGTACATTC TGCACCAGAA GAAGGAGATT GCCCGGCAGA 300

TGAAGGCCTA CGAGAAGCAG CGGGGCACCC GGCGCGAGGA GCAGAAGGAG CTTCAGCGGG 360

CGGCCTCGCA GGACCATGTG CGGGGCTTCC TGGAGAAGGA GTCGGCTATC GTGAGCCGGC 420

CCCTCAACCC TTTCACAGCC AAGGCCCTCT CGGGCACCAG CCCAGATGAT GTCCAACCTG 480

GGCCCAGTGT GGGTCCTCCA AGTAAGGACA AGGACAAAGT GCTGCCCAGC TTCTGGATCC 540

CGTCGCTGAC GCCCGAAGCC AAGGCCACCA AGCTGGAGAA GCCGTCCCGC ACGGTGACCT 600

GCCCCATGTC AGGGAAGCCC CTGCGCATGT CGGACCTGAC GCCCGTGCAC TTCACACCGC 660

TAGACAGCTC CGTGGACCGC GTGGGGCTCA TCACCCGCAG CGAGCGCTAC GTGTGTGCCG 720

TGACCCGCGA CAGCCTGAGC AACGCCACCC CCTGCGCTGT GCTGCGGCCC TCTGGGGCTG 780

TGGTCACCCT CGAATGCGTG GAGAAGCTGA TTCGGAAGGA CATGGTGGAC CCTGTGACTG 840

GAGACAAACT CACAGACCGC GACATCATCG TGCTGCAGCG GGGCGGTACC GSTTCGCGGG 900

CTCCGGAGTG AAGCTGCAAG CGGAGAAATC ACGGCCGGTG ATGCAGGCCT GAGTGTGTGC 960

GGGAGACCAA ATAAACCGGC TTGGGTGCGG AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA 1020

AAAA 1024

(2) INFORMATION FOR SEQ ID NO: 45:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 983 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 45:

```
CGACACGGCT GCGAGAAGAC GACAGAAGGG CCCGACCGCG AGCCGTCCAG GTCTCAGTGC    60
TGTGCCCCCC CCAGAGCCTA GAGGATGTTT CATGGGATCC CAGCCACGCC GGGCATAGGA   120
GCCCCTGGGA ACAAGCCGGA GCTGTATGAG GAAGTGAAGT TGTACAAGAA CGCCCGGGAG   180
AGGGAGAAGT ACGACAACAT GGCAGAGCTG TTTGCGGTGG TGAAGACAAT GCAAGCCCTG   240
GAGAAGGCCT ACATCAAGGA CTGTGTCTCC CCCAGCGAGT ACACTGCAGC CTGCTCCCGG   300
CTCCTGGTCC AATACAAAGC TGCCTTCAGG CAGGTCCAGG GCTCAGAAAT CAGCTCTATT   360
GACGAATTCT GCCGCAAGTT CCGCCTGGAC TGCCCGCTGG CCATGGAGCG GATCAAGGAG   420
GACCGGCCCA TCACCATCAA GGACGACAAG GGCAACCTCA ACCGCTGCAT CGCAGACGTG   480
GTCTCGCTCT TCATCACGGT CATGGACAAG CTGCGCCTGG AGATCCGCGC CATGGATGAG   540
ATCCAGCCCG ACCTGCGAGA GCTGATGGAG ACCATGCACC GCATGAGCCA CCTCCCACCC   600
GACTTTGAGG GCCGCCAGAC GGTCAGCCAG TGGCTGCAGA CCCTGAGCGG CATGTCGGCG   660
TCAGATGAGC TGGACGACTC ACAGGTGCGT CAGATGCTGT TCGACCTGGA GTCAGCCTAC   720
AACGCCTTCA ACCGCTTCCT GCATGCCTGA GCCCGGGGCA CTAGCCCTTG CACAGAAGGG   780
CAGAGTCTGA GGCGATGGCT CCTGGTCCCC TGTCCGCCAC ACAGGCCGTG GTCATCCACA   840
CAACTCACTG TCTGCAGCTG CCTGTCTGGT GTCTGTCTTT GGTGTCAGAA CTTTTGGGCC   900
GGGCCCCTCC CCACAATAAA GATGCTCTCC GACCTTCAAA AAAAAAAAAA AAAAAAAAGR   960
KGSGGCCGGT CCCCANTCCC CCC                                           983
```

(2) INFORMATION FOR SEQ ID NO: 46:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2421 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 46:

```
CCGGCTGATC GCTGCCGCTC CGCCAATACA ATAGAGCCAK CCACTACCAG CAGCCTGGCC    60
```

CTCTTCCTCC TTCTCCAGAG AGACCAATCC AGCCGAACTC GGGGTTTGCC TGAGGAGAAG 120
GAGGAAGTGA CCATGGACAC AAGTGAAAAC AGACCTGAAA ATGATGTTCC AGAACCTCCC 180
ATGCCTATTG CAGACCAAGT CAGCAATGAT GACCGCCCGG AGGGCAGTGT TGAAGATGAG 240
GAGAAGAAAG AGAGCTCGCT GCCCAAATCA TTCAAGAGGA AGATCTCCGT TGTCTCAGCT 300
ACCAAGGGGG TGCCAGCTGG AAACAGTGAC ACAGAGGGGG GCCAGCCTGG TCGGAAACGA 360
CGCTGGGGAG CCAGCACAGC CACCACACAG AAGAAACCTT CCATCAGTAT CACCACTGAA 420
TCACTAAAGA GCCTCATCCC CGACATCAAA CCCCTGGCGG GGCAGGAGGC TGTTGTGGAT 480
CTTCATGCTG ATGACTCTCG CATCTCTGAG GATGAGACAG AGCGTAATGG CGATGATGGG 540
ACCCATGACA AGGGGCTGAA AATATGCCGG ACAGTCACTC AGGTAGTACC TGCAGAGGGC 600
CAGGAGAATG GGCAGAGGGA AGAAGAGGAA GAAGAGAAGG AACCTGAAGC AGAACCTCCT 660
GTACCTCCCC AGGTGTCAGT AGAGGTGGCC TTGCCCCCAC CTGCAGAGCA TGAAGTAAAG 720
AAAGTGACTT TAGGAGATAC CTTAACTCGA CGTTCCATTA GCCAGCAGAA GTCCGGAGTT 780
TCCATTACCA TTGATGACCC AGTCCGAACT GCCCAGGTGC CCTCCCCACC CCGGGGCAAG 840
ATTAGCAACA TTGTCCATAT CTCCAATTTG GTCCGTCCTT TCACTTTAGG CCAGCTAAAG 900
GAGTTGTTGG GGCGCACAGG AACCTTGGTG GAAGAGGCCT TCTGGATTGA CAAGATCAAA 960
TCTCATTGCT TTGTAACGTA CTCAACAGTA GAGGAAGCTG TTGCCACCCG CACAGCTCTG 1020
CACGGGGTCA AATGGCCCCA GTCCAATCCC AAATTCCTTT GTGCTGACTA TGCCGAGCAA 1080
GATGAGCTGG ATTATCACCG AGGCCTCTTG GTGGACCGTC CCTCTGAAAC TAAGACAGAG 1140
GAGCAGGGAA TACCACGGCC CCTGCACCCC CCACCCCCAC CCCCGGTCCA GCCACCACAG 1200
CACCCCCGGG CAGAGCAGCG GGAGCAGGAA CGGGCAGTGC GGGAACAGTG GGCAGAACGG 1260
GAACGGGAAA TGGAGCGGCG GGAGCGGACT CGATCAGAGC GTGAATGGGA TCGGGACAAA 1320
GTTCGAGAAG GGCCCCGTTC CCGATCAAGG TCCCGTAACC GCCGCCGCAA GGAACGTGCG 1380
AAGTCTAAAG AAAAGAAGAG TGAGAAGAAA GAGAAAGCCC AGGAGGAACC ACCTGCCAAG 1440
CTGCTGGATG ACCTTTTCCG AAAGACCAAG GCAGCTCCCT GCATCTATTG GCTCCCACTG 1500
ACTGACAGCC AGATCGTTCA GAAAGAGGCA GAGCGGGCCG AACGGGCCAA GGAGCGGGAG 1560
AAGCGGCGAA AGGAGCAAGA AGAAGAAGAG CAAAAGGAGC GGGAGAAGGA AGCCGAGCGG 1620
GAACGGAACC GACAGCTGGA GCGAGAGAAA CGTCGGGAGC ACAGTCGGGA GAGGGACAGG 1680
GAGAGAGAGA GAGAAAGGGA GCGGGACAGG GGGGACCGAG ATCGGGATAG GGAAAGGGAC 1740
CGAGAACGAG GCAGGGAAAG GGATCGCAGG GACACCAAGC GCCACAGCAG AAGCCGGAGT 1800
CGGAGCACAC CTGTGCGGGA CCGGGGTGGG CGCCGCTAGC TGGGAAAACA CTAGAGCTGC 1860

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AGGTACCAGC CACTCGGCCC CAGGGGGTTA TGGCCACAGA GGGATAGGCA CAGTCTCCAC    1920
CACCCTGGAG CCAAGGGTCT TTCACATCAC CTATCCCTAC ATACATACCA AATGGAAAAG    1980
TGGCCATCCT TTTCCCCCCA AACACACCCC CTTAACCTAT CTCTTGGGAC TTAGCCCGAC    2040
CCTCCCTCTC ATTTCCCATT AAGTCTGAGA GGCAAGAGCT AGGTTAGGCA AGGAGGTGGT    2100
TGGCCAGAGA TGGGGAACAG CCAGGTGCCC CAGTCCTCTG ATTTTTCCTC CATCCTGCTT    2160
ACCACCTCCC TGGGTACTTA CAGCCTTCTC TTGGGAACAG CCGGGGCCAG GACTGGGTCA    2220
CCTATGAGCT GAATCAGCAT CTCCTCCTGA GTCCCAGGGC CCCTGCAGTT CCCAGTCTCT    2280
TCTGTCCTGC AGCCCTTGCC TCTTTCCCAC AGGTTCCACT TTATATCCAC CTTTTCCTTT    2340
TGTTCAATTT TTATTTTTAT TTTTTTTATT ATTAAATGAT GTGGTCTATG GAAAAAAAAA    2400
TAAAAATCTG ACTTAGTTTT A                                              2421
```

(2) INFORMATION FOR SEQ ID NO: 47:

(i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 840 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 47:

```
CTCAAACTCC TGAGCTGAAG CGATCTACCT GCCTCAGCTA GGATTACAGG TGTGAGCCAC      60
CGCACCCAAC CTCAATAAGC KTATTTGATA AAAKATATGC AAGCTCCCTT TATKCACTTT     120
TCATTCAGAA TGTTTAGTAA TTTGTATTGT TTTTCAGATT TTCAGCCCAA TATATCTCCY     180
TGCCCACTGT GTCACTGTAT TCTACCTAWA CATCATCACG TGTTTCTGCT ATTGGCTGTA     240
TGATGGAACA CTGCGGCTCA TTTTCCTGAA AACTGCCGAT AGTGCATAGA RTGCTGGGAT     300
GGAAACCAGA ARCTTTGAAT TCAAGCCTTG GTTCTGCCTT GTTTTTGCTT GGGTGGCCTT     360
GAGTCAGCCA CATACCTTTT AAAATCTCAA TTTATTAGAA ATTATTCCAA ATCAAAATCA     420
AATGAGAAGG TATATACAAA AGTGCTTTAT CCCACAATAA ACTATTCAAG AGAGAGCAAA     480
GGAGAGGACA TTTACTCAAC ACCTCCTAAA AGGCAGCCAG TGAAATTAGG CATTTTATTT     540
AATCCTCCTG GCAACTCTGA GAGTAAAGCA TTATTAATCC CATTTTGGCT GTTTAAAGAA     600
ATTATTTGCA CTAGATTCCA GCTGTAGTTT AGYTTCAGAA AAAAAAATCC TGAGATGTGA     660
ATTCACAGCT TTCTGGGTTT AAAGCCCAAG CTCTATCACA TCATGCTATT ATTGTTACAT     720
TACTGCTAGT TCTATGAAAA GAAATACTAA TTTATGAAAT ACATCTTATC CAAAAAAAAA     780
AAAAAAAAAC TGGGAGGGGG GGCCCGTACC CAAATCGCCG GATAGTGATC GTAAACAATC     840
```

(2) INFORMATION FOR SEQ ID NO: 48:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2432 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 48:

```
GGCACGAGGC CCGGAACGCT GAGGAAGGGC CCGTCCCGCC TTCCCCGGCG CGCCATGGAG    60
CCCCGGGCGG TTGCAGAAGC CGTGGAGACG GGTGAGGAGG ATGTGATTAT GGAAGCTCTG   120
CGGTCATACA ACCAGGAGCA CTCCCAGAGC TTCACGTTTG ATGATGCCCA ACAGGAGGAC   180
CGGAAGAGAC TGGCGGASTG CTGGTCTCCG TCCTGGAACA GGGCTTGCCA CCCTCCCACC   240
GTGTCATCTG GCTGCAGAGT GTCCGAATCC TGTCCCGGGA CCGCAACTGC CTGGACCCGT   300
TCACCAGCCG CCAGAGCCTG CAGGCAYTAG CCTGYTATGY TGACATCTCT GTCTCTGAGG   360
GGTCCGTCCC AGAGTCCGCA GACATGGATG TTGTACTGGA GTCCCTCAAG TGCCTGTGCA   420
ACCTCGTGCT CAGCAGCCCT GTGGCACAGA TGCTGGCAGC AGAGGCCCGC CTAGTGGTGA   480
AGCTCACAGA GCGTGTGGGG CTGTACCGTG AGAGGAGCTT CCCCCACGAT GTCCAGTTCT   540
TTGACTTGCG GCTCCTCTTC CTGCTAACGG CACTCCGCAC CGATGTGCGC CANAGCTGTT   600
TCAGGAGCTG AAAGGAGTGC GCCTGCTAAC TGACACACTG GAGCTGACGC TGGGGGTGAC   660
TCCTGAAGGG AACCCCCCAC CCACGCTCCT TCCTTCCCAA GAGACTGAGC GGGCCATGGA   720
GATCCTCAAA GTGCTCTTCA ACATCACCCT GGACTCCATC AAGGGGGAGG TGGACGAGGA   780
AGACGCTGCC CTTTACCGAC ACCTGGGGAC CCTTCTCCGG CACTGTGTGA TGATCGCTAC   840
TGCTGGAGAC CGCACAGAGG AGTTCCACGG CCACGCAGTA ASCCTCCTGG GGAACTTGCC   900
CCTCAAGTGT CTGGATGTTC TCCTCACCCT GGAGCCACAT GGAGACTCCA CGGAGTTCAT   960
GGGAGTGAAT ATGGATGTGA TTCGTGCCCT CCTCATCTTC CTAGAGAAGC GTTTGCACAA  1020
GACACACAGG CTGAAGGAGA GTGTAGCTCC CGTGCTGAGC GTGCTGACTG AATGTGCCCG  1080
GATGCACCGC CCAGCCAGGA AGTTCCTGAA GGCCCAGGTG CTGCCCCCTC TGCGGGATGT  1140
GAGGACACGG CCTGAGGTTG GGGAGATGCT GCGGAACAAG CTTGTCCGCC TCATGACACA  1200
CCTGGACACA GATGTGAAGA GGGTGGCTGC CGAGTTCTTG TTTGTCCTGT GCTCTGAGAG  1260
TGTGCCCCGA TTCATCAAGT ACACAGGCTA TGGGAATGCT GCTGGCCTTC TGGCTGCCAG  1320
GGGCCTCATG GCAGGAGGCG GCCCGAGGCC AGTACTCAGA GGATGAGGAC ACAGACACAG  1380
```

ATGAGTACAA GGAAGCCAAA GCCAGCATAA ACCCTGTGAC CGGGAGGGTG GAGGAGAAGC 1440

CGCCTAACCC TATGGAGGGC ATGACAGAGG AGCAGAAGGA GCACGAGGCC ATGAAGCTGG 1500

TGACCATGTT TGACAAGCTC TCCAGGAACA GAGTCATCCA GCCAATGGGG ATGAGTCCCC 1560

GGGGTCATCT TACGTCCCTG CAGGATGCCA TGTGCGAGAC TATGGAGCAG CAGCTCTCCT 1620

CGGACCCTGA CTCGGACCCT GACTGAGGAT GGCAGCTCTT CTGCTCCCCC ATCAGGACTG 1680

GTGCTGCTTC CAGAGACTTC CTTGGGGTTG CAACCTGGGG AAGCCACATC CCACTGGATC 1740

CACACCCGCC CCCACTTCTC CATCTTAGAA ACCCCTTCTC TTGACTCCCG TTCTGTTCAT 1800

GATTTGCCTC TGGTCCAGTT TCTCATCTCT GGACTGCAAC GGTCTTCTTG TGCTAGAACT 1860

CAGGCTCAGC CTCGAATTCC ACAGACGAAG TACTTTCTTT TGTCTGCGCC AAGAGGAATG 1920

TGTTCAGAAG CTGCTGCCTG AGGGCAGGGC CTACCTGGGC ACACAGAAGA GCATATGGGA 1980

GGGCAGGGGT TTGGGTGTGG GTGCACACAA AGCAAGCACC ATCTGGGATT GGCACACTGG 2040

CAGAGCMANT GTKTTGGGGT ATGTGCTGCA CTTCCCAGGG AGAAAACCTG TCAGAACTTT 2100

CCATACGAGT ATATCAGAAC ACACCCTTCC AAGGTATGTA TGCTCTGTTG TTCCTGTCCT 2160

GTCTTCACTG AGCGCAGGGC TGGAGGCCTC TTAGACATTC TCCTTGGTCC TCGTTCAGCT 2220

GCCCACTGTA GTATCCACAG TGCCCGAGTT CTCGCTGGTT TTGGCAATTA AACCTCCTTC 2280

CTACTGGTTT AGACTACACT TACAACAAGG AAAATGCCCC TCGTGTGACC ATAGATTGAG 2340

ATTTATACCA CATACCACAC ATAGCCACAG AAACATCATC TTGAAATAAA GAAGAGTTTT 2400

GGACAAAAAA AAAAAAAAAA AAAAAAAAAA AA 2432

(2) INFORMATION FOR SEQ ID NO: 49:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1742 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 49:

GTCCTGCAGG AGCTGCACGC GGCCGAGGTG CGCANGAACA AGGAGCAGCG AGAAGAGATG 60

TCGGGCTAAG GGCCCGGSAC GRGSGGCGCC CATCCTGCGA CGGAACACGT TCGGGTTTTG 120

GTTTTGTTTC GTTCACCTCT GTCTAGATGC AACTTTTGTT CCTCCTCCCC CACCCCAGCC 180

CCCAGCTTCA TGCTTCTCTT CCGCACTCAG CCGCCCTGCC CTGTCCTCGT GGTGAGTCGC 240

TGACCACGGC TTCCCCTGCA GGAGCCGCCG GGCGTGRAGA CGCGGTCCCT CGGTGCAGAC 300

ACCAGGCCGG GCGCGGCTGG GTCCCCCGGG GGCCCTGTGA GAGAGGTGGY GGTGACCGTG 360

GTAAACCCAG GGCGGTGGCG TGGGATCRCG GGTCCTTACG CTGGGCTGTC TGGTCAGCAC 420

GTGCAGGTCA GGGCAGGTCC TCTGAGCCGG CGCCCCTGGC CAGCAGGCGA GGCTACAGTA 480

CCTGCTGTCT TTCCAGGGGG AAGGGGCTCC CCATGAGGRA GGGGCGACGG GGGAGGGGGG 540

TGATGGTGCC TGGGAAGCCT GCKTGTGCAN CCGGTGCTTG TTGAACTGGC AGGCGGGTGG 600

GTGGGGGCTG CAGCTTTCCT TAATGTGGTT GCACAGGGGT CCTCTRAGAC CACCTGGCGT 660

GAGGTGGACA CCCTGGGCCT TCCTGGAAGC CTGCAGTTGG GGGCCTGCCC TGAGTCTGCT 720

GGGGAGTGGG CATTCTCTGC CAGGGACCCA TGAGCAGGCT GCATGGTCTA GAGGTTGTGG 780

GCAGCATGGA CAGTCCCCCA CTCAGAAGTG CAAGAGTTCC AAAGAGCCTC TGGCCCAGGC 840

CCCTCCGTGG GACAGCCCCG CCGCCCCTCC CCACCAGGGC TTTGCAGATG TCCTTGAAAG 900

ACCCACCCTA GAGCCCTTTG GAGTGCTGGC CCCTCCTGTG CCCTCTGCCC TGGTGGAAGC 960

GGCASCACAA GTCCTCCTCA GGGAGCCCCA AGGGGGATTT TKTGGGACCG CTGCCCACAG 1020

ATCCAGGTGT TGGAAGGGCA GCGGGTAAGG TTCCCAAGCC AGCCCCAACA CCCTTCCCAC 1080

TTGGCACCCA GAGGGGGCTG TGGGTGGAGG CCTGACTCCA GGCCTCTCCT GCCCACACCC 1140

TCTGGGCTGA GTTCCTTCTT TCCCTTGGAC GCCCAGTGCT GGCCTTGGAG GACGGTCAGC 1200

TGGAGGATGG CGGTGGGGGA GGCTGTCTTT GTACCACTGC AGCATCCCCC ACTTCTCCAC 1260

GGAAGCCCCA TCCCAAAGCT GCTGCCTGGC CCCTTGCTGT AAAGTGTGAA GGGGGCGGCT 1320

GAGTTCTCTT AGGACCCAGA GCCAGGGCCC TCAACTTCCA TCCTGCGGGA GGCCTTGGCC 1380

GGGCACTGCC AGTGTCTTCC AGAGCCACAC CCAGGGACCA CGGGAGGATC CTGACCCCTG 1440

CAGGGCTCAG GGGTCAGCAG GGACCCACTG CCCCATCTCC CTCTCCCCAC CAAGACAGCC 1500

CCAGAAGGAG CAGCCAGCTG GGATGGGAAC CCAAGGCTGT CCACATCTGG CTTTTGTGGG 1560

ACTCAGAAAG GGAAGCAGAA CTGAGGGCTG GGATATTCCT CATGGTGGCA GCGCTCATAG 1620

CGAAAGCCTA CTGTAATATG CACCCATCTC ATCCACGTAG TAAAGTGAAC TTAAAAATTC 1680

AATCAAATGA ACAATTAAAT AAACACCTGT GTGTTTAAGA AAAAAAAAAA AAAAAAACTG 1740

CG 1742

(2) INFORMATION FOR SEQ ID NO: 50:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 1427 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: double

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 50:

```
GGCACGAGCC TCCGCGAACT GTGGAGTCGG CGGAGGGCTG GAATCAGCGT GGGCTCCAGG     60
TCGCTGGCAG CCGGGTGGCA GAACTCTTCC GAGGCTCCTT GGGAAGAAGC TACACCCGAG    120
GGAGCCGGAT GGGCCTCGAA AACCTGGCCC GCTCTGGTTC TGTACCATTG CAAGGGGAAC    180
CGTAAACTGA GCTTTTCTAA CGTGGGTTTC TGCCAAGTAC TTTTCCAGCT GCCCCCTTCC    240
CCCCAGCACA CAGGAGAGCC TCTGTGTAGC CAGCGCTTGA CAGTCGTTAG GTAGGTTGTA    300
CTGTGTAGGG AGGAGCTCAA GATCATGAAT GGTTGTCACA GGAGAAAGCG GTTGCATCTT    360
TGCAAAACTA TATACCTGCT GTGGTTTGTG TTTTCTTTTC TGCTGAGTAA TGAAGTTGTA    420
AGTTCACACT GGCACATTCT CAGGGCTGTG CAGATTATTT GCACTTTATT TCATAGGTGA    480
ATAAGTGCTT TTTAGCTTTC TTTGTATATT GAGTTGCTTT TGAATTGCTT CCCATATTTT    540
TATTTCATAC AAACTGAACA ATTGTGGCCC CTCTATTTTA TTTATAAAGG TTCAGTGTAT    600
CTTTGCCTGC CTACATCAAT CTGCAAGGGA GTTGCAGAAA GCCTCATGTT CATCGAGCCG    660
TGAGTCACAA CCAATTTCTA AGCTGTTATA ACAAAAAAGT GTTTGCTTTT TTTCACAAGT    720
AACTTTAAAA GTGTAGTTTA GAAAGAAAAC ATTTTCAATA AAAAGACACT ACATTAATCC    780
TGGATGCTTG CAAATCCTAA AATMTATTCC TCCTCTAGCG TTGCACAGCT CTGTGTTGTA    840
TACACAGACT AGCTTTAAAA TTTGTCACAT AGCACTTTAC CTTTACTTTT ATGTATCATT    900
CCCCCGACTT CCTTACTGCA GGTGTGGGCA AGAAAACTTT TCCTTTAACA CTTTTCAACA    960
GCGGGCATAA AATTCTGCAG CTGAGGTCTT GAAGAATGCA GATGGGTACA GTATGTGTTG   1020
GAGCTCACAG TGTGTATTGA CTAACCTAGT TCCTTTTTTG CTTTTTTTGG TATTGTCTTG   1080
TTAAAAGTGA CTCCCAGGTA GCAACTCTCT TTTTTAAGGG TGGGAACGAA AGGGACGTAG   1140
GAAGAATAGA TCTAGATTAT TTAACAGTCT TCGATAGAGT TTGAAAGCTT TCTTCTTCAT   1200
TCAATTTTGG GCAAAATACT GCCTCTGCAT TTGTTCATAA CAAAAAGATT AGATTAATAA   1260
GTAGCTTTTG TTGGTGGAAA TTACCAGCTC TATAAGTCAC CCTTGGTGGT TCATGGACCT   1320
CTGATTAGCT TGGGTTTTGC AGTCTCATTG CCACATGTAT ATGTGGAGCC AATGGCCTTT   1380
TGGTGCTCAG CTGTTTACGT CTGACTCCTT GACTTCTTTG GTACAGTGAT GGAGTCAGAT   1440
CTCATTAAGT GTGATTCTCC ATGGATATAA CCAGCCCCAA AAAAANG                 1487
```

(2) INFORMATION FOR SEQ ID NO: 51:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1338 base pairs
(B) TYPE: nucleic acid

(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 51:

```
GGCACGAGCT CGTGCCGAAT TCGGCACGAG AGAAGATTTG AAGAAGCCAG ATCCAGCTTC      60
CCTGCGGGCT GCTTCTTGTG GGGAAGGGAA AAAGAGGAAG GCCTGTAAGA ACTGCACCTG     120
TGGCCTTGCC GAAGAACTGG AAAAAGAGAA GTCAAGGGAA CAGATGAGCT CCCAACCCAA     180
GTCAGCTTGT GGAAACTGCT ACCTGGGCGA TGCCTTCCGC TGTGCCAGCT GCCCCTACCT     240
TGGGATGCCA GCCTTCAAAC CTGGGGAAAA GGTGCTTCTG AGTGATAGCA ATCTTCATGA     300
TGCCTAGGAG GTTCCTGACA TGGGACCCAT CTGCTCCTCC AGCCAACTCC TGTCCCTCAC     360
ATCCCACCAT GGTGGCTCCT CCCACCTCCT CTGGATTTGT TCACTCTGAG ATCTGTTTGC     420
AGAGTGGGTG CTTAGCAGAC AGAGTGAAGC TGGCTGGGGG GCACAGTGGT GTGTAGTGCT     480
GCTGTGTATC AAAAGACCAA GGTATTATGG GACCTGGTTT CAGAATGGGA TGGGTTTCTT     540
CACCTCATGT TAAGAGAAGG GAGTGTGTCC TGAAGAAGCC CTTCTTCTGA TGTTAAAATG     600
CTGACCAGAA CGCTCTTGAG CCCAGGCATC GTTGAGCATT AACACTCTGT GACAGAGCTG     660
CAGACCCCTG CCTTGAGTCT CATCTCAGCA ATGCTGCCAC CCTCTTGTCT TTCAGAGTTG     720
TTAGTTTACT CCATTCTTTG TGACACGAGT CAAGTGGCTC ACAACCTCCT CAGGGCACCA     780
GAGGACTCAC TCACTGGTTG CTGTGATGAT ATCCAGTGTC CCTCTGCCCC CTTCCATCCC     840
CAACCACATT TGACTGTAGC ATTGCATCTG TGTCCTGTTG TCATTTATGT TAACCTTCAG     900
GTATTAAACT TGCTGCATAT CTTGACATAT CTTGAGATTC TGCATGTCTT GTAAAGAGAG     960
GGGATGTGCA TTTGTGTGTG ATGTTGGATA GTCATCCACG CTCAGTTTGG ACCATTGGAG    1020
GAACTTAGTG TCACGCACAA ATGGGGCTAT TCCTACGCTT AGAATAGGGC TTGTCTGCCC    1080
ACTTTAGAAG AGTCCCAGGT TGGTGAGCAT TTAGAGGGAA GCAGGGCAGA ACTCTGAACG    1140
ACAATACGTC TCTCTGAGCA GAGACCCCTT TGTTCTTGTT ATCCACCCAT ATGGACTTGG    1200
AATCAATCTT GCCAAATATT TGGAGAGATT GTGTGGATTT AAGAGACCTG GATTTTTATA    1260
TTTTACCAGT AAATAAAAGT TTTCATTGAT ATCTGTCCTT GAAAAAAAAA AAAAAAAAAA    1320
AAACTCGA                                                             1328
```

(2) INFORMATION FOR SEQ ID NO: 52:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1856 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 31:

```
GAATTCGGCA CGAGCTTTGC AACATTGCAA ATGAACTTGC AGTCCAGGGT TCCGCTGCCC      60
CCTAGATTAA ATTCCCCGGG CTGAAATTGA GTTGCAGATT TACAATATCA TATTTTAAAT     120
TGCTGTCTTC AATTAAACCA TTTATGACCA TAACTAATTT TCAGCATGTC GATGCATGCT     180
TTTCCAGGCC TTCCTTCTTT GTACAAAAGT AAATGTCCAT AAAGCCTTTC ACTTATATTC     240
TTCAAACATG ATGCTAATTT AAATTAATTA CTTCCTATGA TATGTTATTA TTCCTATGAT     300
TTTGCCACTG TTATTAGTTC TCTCAAAAAT ACATCTAGGG AAGAGGATTA TTTTAAGTPA     360
TTTGATTATC TTTCTATCTC TTTTATTTAT TTCTCATTTA CTTAAGAAAT TCGTTCCATT     420
GGTTGGCATT GATACAGTAA ATTTGTAAAT GAGGAGACAA TATAAAAAAT CTAAATTACT     480
TGTGCTTAAT GACTGTAGCA GAATSCTTTT TCTCTAAATC AGATTGTCTT TCTTGCAGTT     540
TAGTTTGATA GATTTGCAAG CTATGCTGTT TCCATGAAGT TAGTTGCGTT GGTAGGAACG     600
CAGGCTTCTT TGTCTCTGGT TGTAGCTTGC ATGATTGCCC CATTAGGCAG ACAACGTAGC     660
CGGAGATCAC AAATCAGGCC CTTGGTTTAG TTGCTAGTTT GTGGAGGTGC AGAGAGGTTG     720
GCAGAAACTG ACCTCACTGG GCAAGGGTGG CCATGGACCT GATTCTTTAA TGCACTCTAT     780
GTGTTCAGGA AGCCACAGGC CATATTTGAC TCTGAGAAAG AAAACAAGAG GAAAAACCCC     840
ACAAAGTATA ACAACCCCTT AAGATAAATC TATTTTAAAG TGAAATTAAT TTTTCAGTTT     900
ATACCATTGG CCAATTACAA GATAAAAATG TTCAATTTCT TTAAGAATCC TTTGTTGACT     960
TGTCTTTTCA TCTCTTGCTA TTTATATTTG TCACTGTTAG TCAACAAAGT CTTATTTGCT    1020
GAGGAAGGAC TTTGCTGCAC TTACTGTACC ACATCAAACA CTGGGGAGGG TGGTGTTTAA    1080
CTTTTTAAAA AATGTTATTC TGATTATAAC AATAATATTG GCTTTTTTCA TGAAAAGAGC    1140
GCCACCTTGC AAGGTTTAGT GAGATTTATG GAAGTTGAAT ACTTAGCCAG GAATTGCTGC    1200
TAGCTCCAAA AATTTGCGAA GCAAAAGCTA GCCCCAATTG GTTTGGAAGT TTGAAACTGA    1260
TTAACAGATT TGCATTTGAA GTGACTTCAG ACATTAGGTT CAGACATTAG TTAAAAATAG    1320
AAAGAGGAAT AAAGACATCT YTTCTCTCTA GAAAAGATAA CACCTCAACT AATAATCCTT    1380
CCCACTTTCA TTGAGATCAG CTTGTCTGAT AACCTGATAT GAGTTGACTA ATGATAAACA    1440
TGATAATAGT GGTACTTTTG TAATTTTGCT GGTGCATTTA AGAAGATAGT AAAKGATGAG    1500
TTCAKCTTTT CTYCGAACAT YCCTATYCCT AGATGTAGTT TACTTCAAAT TGGGAATTAT    1560
AACTGTCCTA ATTTTTGTTG TGTACCTTGA TGCCCCTTTT GCTTTAATAC CCACAGTGTA    1620
ACAATTAAAT ATCACACTAT GACATATGAT TTAAGTAGTA TATTTTAAAG ATAAATTTTA    1680
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GGGGTAAATG TTTACTTCAA AATGACTCCA TATTTCAAAT ATCTGTTTAG ACTGTGAAGG    1740
CCAAATAATT TTTAAGAAAA CATTTGAAGA GTAGTGTGTT TGCATTTGTG AATAATCTTA    1800
CTCACAGCAA GTAAACGTAA TAAAAGCCAA CATTTAAGCC AAAAAAAAAA AAAAAA        1856
```

(2) INFORMATION FOR SEQ ID NO: 53:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1558 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 53:

```
TGGGTATCCA TTCCTGNAAT TACTTTACTT AGGATAATGG CCTCCAGCTC CGTCCAAGTT      60
GCTGCAAAAG GTATTATTTC GTTCCTTTTT GTGGCTGAGT AGTATTCCAT GGTGTATATA     120
TACCACATTT TCTTTATCCA CTCATTGCTT GATGGGCAGT TAGGTTGGTT CCACATCTTT     180
GCAATTGTGA GTTGTGCTGC TCCAGATATC ATCTTTAACT CCTTTGCCTT CTCCACATAC     240
ATTTCCAAGT CCTGTTCATT CTACCTCCAA AATGTATCTT GTATCCATTC ATCTCTCTCC     300
ATCTTCAATC TATTTCAATG CCCCATCATC TCTTGCATGG AGGAGTGTAA TAATTGGCTA     360
ACTGGCCTGT TCTTACATTT TAAAATCAAA AGATGTGACA GGTGAAATGC CTATTTCAGT     420
GTCCATTGAT GGTTCTGCTT ACACACCACC TGGCTGCCTG GTGTCGCAGT GGCAGAGTTG     480
AGCAGTGTGA AAAAGACTGC TTGGCCCTTT ACAGGGAAAG CAGGTCCACT GTGGCCTGTG     540
AGGACGAGAG CTCTGGGCAG GCTCGGACAC TGGCAGACCC TGGTCCTGGC TGGCCAAGGC     600
AGCAGGGTAT GTGTTTCGGG TCACTCACAG GGCTCAGCAC CACTCCTCAT GGCTTCCTTA     660
CTGTTTCGGC AGAGGCTGAC CCGCGGCTGA TTGAGTCCCT CTCCCAGATG CTGTCCATGG     720
GCTTCTCTGA TGAACGCGGC TGGCTCACCA GGCTCCTGCA GACCAAGAAC TATGACATCG     780
GAGCGGCTCT GGACACCATC CAGTATTCAA AGCATCCCCC GCCGTTGTGA CCACTTTTGC     840
CCACCTCTTC TGCGTGCCCC TCTTCTGTCT CATAGTTGTG TTAAGCTTGC GTAGAATTGC     900
AGGTCTCTGT ACGGGCCAGT TTCTCTGCCT TCTTCCAGGA TCAGGGGTTA GGGTGCAAGA     960
AGCCATTTAG GGCAGCAAAA CAAGTGACAT GAAGGGAGGG TCCCTGTGTG TGTGTGTGCT    1020
GATGTTTCCT GGGTGCCCTG GCTCCTTGCA GCAGGGCTGG GCCTGCGAGA CCCAAGGCTC    1080
ACTGCAGCGC GCTCCTGACC CCTCCCTGCA GGGGCTACGT TAGCAGCCCA GCACATAGCT    1140
TGCCTAATGG CTTTCACTTT CTCTTTTGTT TTAAATGACT CATAGGTCCC TGACATTTAG    1200
TTGATTATTT TCTGCTACAG ACCTGGTACA CTCTGATTTT AGATAAAGTA AGCCTAGGTG    1260
```

TTGTCAGCAG GCAGGCTGGG GAGGCCAGTG TTGTGGGCTT CCTGCTGGGA CTGAGAAGGC 1320

TCACGAAGGG CATCCGCAAT GTTGGTTTCA CTGAGAGCTG CCTCCTGGTC TCTTCACCAC 1380

TGTAGTTCTC TCATTTCCAA ACCATCAGCT GCTTTTAAAA TAAGATCTCT TTGTAGCCAT 1440

CCTGTTAAAT TTGTAAACAA TCTAATTAAA TGGCATCAGC ACTTTAACCA AAAAAAAAAA 1500

AAAAAAAAAA AAANAAAAAA AAAAGGGGGC CGCTCTAGAG GTCCAAGTTA NGACGNGG 1558

(2) INFORMATION FOR SEQ ID NO: 54:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 948 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 54:

TAAAAATCAT GCTCTGTACC ATCCTCACCG TAGTCATCAT CATCGCCGCG CAGACCACGA 60

GAACTACTGG GATCCCTAAA AACGCCCCTG GTCCGGCCCC ACTCTGCGCC CCTCGATCTC 120

CCAGGCTCTT TCTGCAGWCA TACCGCGGAC CCAATGGGCG CCCTGCACAC CCGTTTCTGG 180

GGCCGTCAGA CTTGGATACA TCGTAAACTC CGCCTCCACG GAACGTCTCG CCTKGCGAGC 240

AAGMTCGGAA TCCAGTTCCT CAGGAACCCC TCCAAAACCC ACACCCCCAG GGACGCCGCT 300

TTCCGGGATC CCGGSCAAAC GCCGGACCCT CAGTCGCTCC AGGCCCCCTC ACCCTCAAAG 360

TGTAGCGCCC CCAACCGAGC AACCTCGGTT TGGTCCCTAA AACCCCGCCT CCTCTATAAG 420

CACCGCCCCA GCTCTGACAA AACCCCGCCT CCAGGTCGGC AGGCTCCGCT TCTTTTCTTC 480

TCCGCGGGGT GATTCAGTCC AGTGATTGGG TTTGTGGCTC CAGGCCTCGC CCACAGACGG 540

ACAGACCCCT CCCTTTCTTC CGGCAAAAGG ACCGAGCCCT GGGGTAGTAA GGSCCCCACA 600

CTCCTGTTTT TTGCAAGTAC ATTTTTGTCC YTCCTCCACC CAGGTATCTG CCTATTTTCT 660

TGCTAATCCC AGAACCTTTC CTTTTGCTTT TTTTAAGGAC ATTTGGGAAG TTCCTGGTGT 720

AGGACCCTTC TCCCTGGGAT AAGAAACCTG CCTGTAAACG CTCTGTAAAT ACTCCCTTCC 780

ACCCATCCCA GCCCCTGGGC AGCCGGGCAG AAGGGAATCC AGGCTATGGA CCTCCCAAGT 840

CCCCGCTCCC CGCTCCCCTC GGCGGCCCCG CCTTGTTCTG ATCTGTGTGT GAGTGTGTGT 900

GAACTTCTGA AAGACAATAT TAAAGAGACT TAGTTGAAAA AAAAAAAA 948

(2) INFORMATION FOR SEQ ID NO: 55:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 990 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 55:

```
GGGGAACTGC AGTGACAGCA GGAGTAAGAG TGGGAGGCAG GACAGAGCTG GGACACAGGT     60
ATGGAGAGGG GGTTCAGCGA GCCTAGAGAG GGCAGACTAT CAGGGTGCCG GCGGTGAGAA    120
TCCAGGGAGA GGAGCGGAAA CAGAAGAGGG GCAGAAGACC GGGGCACTTG TGGGTTGCAG    180
AGCCCCTCAG CCATGTTGGG AGCCAAGCCA CACTGGCTAC CAGGTCCCCT ACACAGTCCC    240
GGGCTGCCCT TGGTTCTGGT GCTTCTGGCC CTGGGGGCCG GGTGGGCCCA GGAGGGGTCA    300
GAGCCCGTCC TGCTGGAGGG GGAGTGCCTG GTGGTCTGTG AGCCTGGCCG AGCTGCTGCA    360
GGGGGGCCCG GGGGAGCAGC CCTGGGAGAG GCACCCCCTG GGCGAGTGGC ATTTGYTGCG    420
GTCCGAAGCC ACCACCATGA GCCAGCAGGG GAAACCGGCA ATGGCACCAG TGGGGCCATC    480
TACTTCGACC AGGTCCTGGT GAACGAGGGC GGTGGCTTTG ACCGGGCCTC TGGCTCCTTC    540
GTAGCCCCTG TCCGGGGTGT CTACAGCTTC CGGTTCCATG TGGTGAAGGT GTACAACCGC    600
CAAACTGTCC AGGTGAGCCT GATGCTGAAC ACGTGGCCTG TCATCTCAGC CTTTGCCAAT    660
GATCCTGACG TGACCCGGGA GGCAGCCACC AGCTCTGTGC TACTGCCCTT GGACCCTGGG    720
GACCGAGTGT CTCTGCGCCT GCGTCGGGGG NAATCTACTG GGTGGTTGGA AATACTCAAG    780
TTTCTCTGGC TTCCTCATCT TCCCTCTCTG AAGGACCCAA GTCTTTCAAG CACAAGAATC    840
CAGCCCCTGA CAACTTTCTT CTGCCCTCTC TTGCCCCANA AACAGCANAA GCAGGANANA    900
NACTCCCTCT GGCTCCTATC CCACCTCTTT GCATGGGAAC CTGTGCCAAA CACCCAAGTT    960
TAAGAAAAAA ATAAAACTGT GGCATCTCCA                                     990
```

(2) INFORMATION FOR SEQ ID NO: 56:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1603 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 56:

```
GGTCGACCCA CGCGTCCGGC CCGCCGGCTC CGGAGCGGCT CTGCCTTCCC GAGCGCGGGA     60
CCGCGCCCTG GGGGAGGAGG GCGAACGACG CGGCGATGGC TCCGCGGGCA CTCCCGGGGT    120
```

CCGCCGTCCT AGCCGCTGCT GTCTTCGTGG GAGGCGCCGT GAGTTCGCCG CTGGTGGCTC 180
CGGACAATGG GAGCAGCCGC ACATTGCACT CCAGAACAGA GACGACCCCG TCGCCCAGCA 240
ACGATACTGG GAATGGACAC CCAGAATATA TTGCATACGC GCTTGTCCCT GTGTTCTTTA 300
TCATGGGTCT CTTTGGCGTC CTCATTTNGC CAMCTNGCTT NAAGAAGAAA GGCTATCGTT 360
GTACAACAGA AGCAGAGCAA GATATCGAAG AAGAAAAAGG TTGAAAAGWT AGRATTGAAT 420
GACAGTGTGA ATGAAAACAG TGACACTGTT GGGCAAATCG TCCACTACAT CATGAAAAAT 480
GAAGCGAATG CTGATGTYTT AAAGGCGATG GTAGCAGATA ACAGCCTGTA TGATCCTGAA 540
AGCCCCGTGA CCCCCAGCAC ACCAGGGAGC CCGCCAGTGA GTCCTGGGCT TTGTCACCAG 600
GGGGGACGCC AGGGAAGCAC GTCTGTGGCC ATCATCTGCA TACGGTGGGC GGTGTWGTCG 660
AGAGGGATGT GTGTCATCGG TGTAGGCACA AGCGGTGGCA CTTTATAAAG CCCACTAACA 720
AGTCCAGAGA GAGCAGACCA CGGCGCCAAG GCGAGGTCAC GGTCCTTTCT GTTGGCAGAT 780
TTAGAGTNAC AAAAGTGGAG CACAAGTCAA ACCAGAAGGA ACGGAGAAGC CTGATGTCTG 840
TTAGTGGGGC TGAAACCGTC AATGGGGAGG TGCCGGCAAC ACCTGTGAAG AGAGAACGCA 900
GTGGCACAGA GTAGCAGGTG AGCCGTGGTT TTGGTGACAT TGGGGGCAGA GTGGTGCAGG 960
GTGAGGAGAA GGTACTTGGA GCCTCCCAGG TGCTGTGGCA GCATAGGAAT GGTATTTGAC 1020
AGGGAAGTGG GAGAGCTTTC CTTGACCCAG GAAGACTGAG GGGGACTGAA CATGATTACT 1080
TGTCTGCCTA GAGCTTCTTG TAAAGAAGTC ACAAACTTAG TGCCTCCAGG GGCTTGGCTG 1140
TGTGATAATG AGGATAGAGG ATTACTTGTG AGGCAATGTG GCATGGTGGG GATTGTGGCA 1200
AACTAGAATT CACATCACCC ACCATATAGG GCTTGCATTA CCACGAGGCA GAAAGCACCT 1260
AGTGTTGCTG CATCTTCTTA CGCAAAAAAG ACAAAATCCA GACTTCTAAA ATGTAAAATC 1320
ACTGATTTTC GATATTGGCA GCTTACTTTT TTTTTTTAAA CAACCATGCA GGCCAAATGA 1380
CTTGTAATCT TGTCACCATT TTTAGGTAAA CTGTGACTTG AAAAAGTCTG GAGCAAACAA 1440
ACCAATGCTT TTTCCTTTTA TTCTGTTGGR AACCAGTTTT CTTTGTGTCA CAGTTYTGAA 1500
ACCTCAATAC GAATATTTCT CTTCCCACCA AATATTTTGA GGCAATTGAA AAGCCACAGT 1560
GATTTATTTC TTGATTTGGC AATTTTAATT TTGCAAGACA ATT 1603

(2) INFORMATION FOR SEQ ID NO: 57:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 1052 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 57:

TACAGCTCAG GATGCCTGTA ACATTGTCAT CTCTGGGCTT CTGGGTCCTG CTTAGCCTGC 60
TTTTTCCCTG GACGACTGAC CAGGGATGCG GCCCAGCAAC ATGTTACTAA ATCATACTCT 120
CCTCCCTACC TTTCCCAGAC CTCTCACTCC TGCCTGGTGT TCCAACCCGT TCTGTGGCCA 180
GAGTATACAT TTTGGAACCT CTTCGAGGCC ATCCTGCAGT TCCAGATGAA CCATAGCGTG 240
CTTCAGCAGN AAGGCCCGAG ACATGTATGC AGAGGAGCGG AAGAGGCAGC AGCTGGAGAG 300
GGACCAGGCT ACAGTGACAG AGCAGCTGCT GCGAGAGGGG CTCCAAGCCA GTGGGGACGC 360
CCAGCTCCGA AGGACACGCT TGCACAAACT CTCGGCCAGA CGGGAAGAGC GAGTCCAAGG 420
CTTCCTGCAG GCCTTGGAAC TCAAGCGAGC TGACTGGCTG GCCCGTCTGG GCACTGCATC 480
AGCCTGAATG AGGCTGGCCA CCTGCCACTT TGCCCTGCCC TCTGCCTCCA GGGCTCCMCT 540
MYCCTTCCTT TTCTTGGTGA AAGGCACCTC CTTTCCTGAT AATGAATGGT GTTCCCTTTG 600
CTTGGCTGGG GAGCCCCCCA GGCCAGGTTT GCTGGCCATA GATACCTTTG GGCTGCCTGR 660
GACAGGCTCC TGAGGAGGAT TGAGGGTGAA AGTCTCCCAC GAGTACACTA AACCTAGGTC 720
TGGTCACCAA TAGGGTTTGG AGAGCAAAGG GCCACAACTC ATCAGCTGCC TGTCTCTTAG 780
ATGCACTTTC TTTTTCCACC AGCACATCCT TCAACACACA GAATTTCAGG GAAGAGTTCT 840
CCCCAAAACC CTAGCTCTTT ACCCTTCCAT TTTAGCCTTC CACCCAGCTT CCACAAAAGA 900
TTTGGCTCTA CCTTGGATCT GCTAGTAAAT AACTAATAGG CAGGCAGTTA TTTGGGTAAG 960
GAAAAAAGGG GTGGGAGAGA CAGAAAATTT GCCCACTGCT GCTCCTCCCC TTGGSTYTCC 1020
ACCTGGGATT TGCTATTGAA TCTCTACCCT NN 1052

(2) INFORMATION FOR SEQ ID NO: 58:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 814 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 58:

ACNCGNTGGC GGCCGCTCTA GAACTAGGGG ANCCCCCGGG CTGCAGGAAT TCGGCACGAG 60
CATAGACTTT TAAACTGGTA CGGTTCTTAG AGATGGTCCT TGGCCTTCTG TTGTTGTTGT 120
KGTTTTTTTC TTTTTCTTCT TCTCCTTCTC CTTCTTCTTC TCTTCTCCTT CTTTCTTCTT 180
TTTTTTTTCA GAGTCTTGCT CTGTCACCAA GACTGGAGTG AAGTGATGTG ATCTCGGCTT 240

ACTGCAACCT GGGAGGCAGA GGTTGCAGTG AGTCGAGATG GTGCCATTGC TCTCGTTTGG 300

GCAACAAGAG TGAAACTCTT GTCTCAAAAA AAAAAAAAAA ATGAGGTTTA AGACAGTTTT 360

GTCATTACTG GTGGGATCTG GTCACACAAG ATAGCATTAA ACGTGACATG GCACATAAAA 420

TTGGTTAAAA AATTTTGTTT TTTAATTACG TAATGTAAAA GCCCAACAAA CACTTTATGC 480

AAGATTGGAA TGTATCTTCA AATTCAGATT TAATAAACAT GTAAAGATCC TCTGTATATA 540

AAAGTTGTAT TTAATCCCTT GTGCCCCAAG AATGCTATAA AAGATCCCAA GAATGTTATC 600

TATGAAAAGA TAGCAATAGG GAATGGTGAA CAAATAATTT AATTTGCCAA TTCTAAAAAA 660

CATGGACTTA AACCCCATGA AAACTTGGTT CCATAGTTTT AACTGTTTTA TGGTTCCAAT 720

ACAAAACCAG AGTGGTTTAC ATTCCACAAT NACCAAATTT GCATCCAATN TTGGGGTAAT 780

TTTNGGTATT TGCCATGGGA TACTATTCAT TTTT 814

(2) INFORMATION FOR SEQ ID NO: 59:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1215 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 59:

AGAGGAAGTC TTTTGCCAAG CCTGTTCTCT GGACTAACGC CATCCAGGCT GGGAGGGGAA 60

GAGTGCTCTG CTACACTCGT CCCCCTCCTG CCTCATCTTC CTTCTCAGCC TTGGTTCCTG 120

ATGGGAACAG AATGGAGGGC CTGAGAACAT ACTTTCTAAA TGCCTTTGAC CCAGGAACCG 180

ATTATCTATA TTTGTTCCCA TTTTCCTTCA CCGTGACATT CCAGCATTGT CTGACTGTGA 240

GGTGGGCCTT TGAGAGCCTC CAGGTTCCTC AAAACAGGCC TGAGCGATGG GCATCACACC 300

CTCTGCCTAC CCACRTGCCT GCTTACCTGC CAGATAACCA AGTGNAGATG TCTGCGAGTG 360

GCTAGTTTTC ACATTCTTAC TAGTGTTTGG YTCACCTTTG GGCAAAGGCC CCCTCTAGGC 420

CTTGCCCCAC CTCCATCAAA CGCAGACACT GTAGTCAGAC CTCAGYAATA TAGGAGGCAA 480

TAATCTTTTA ACAGTGTTTT GCAAACAAAC AAAAAGAGAA AAATCCCAGC CAGGGGAACT 540

CGCCACCTGC CCACGCTAGT TCCATCCACG CTCAAGACCC GCCCTTAGAC CAGGCAGGCA 600

AAGGCCCCCA TCACACTCGG CCACTAGTGG GGTCCTGAGG CCAAGAAAGA AACCAGACCC 660

TGTATGACAA GTTGGGKTCT TTCCAGAACA CGACAGAAAC AGGGGGGGCC CCTTGTTAAT 720

GCCACTCCAT ACTCCAGAAG CATTATTCCT TATTTGGGAC AGCCAAGGGC AGATTCACAG 780

GTTATTGTAG GAATAAAGAC TAGTTTACAA AGGARAAAGA GSCCCTGGAC TTCCCMAGGA 840

AAGGTCAGGT TAGGGCTCCT GTACCCATTC TGTTCCACCA CTGTTTGATC TCTCTGGCCT 900

CCCACCAGGA ATGCCGTTTC CTTTTTATGG ATCTGTTGGG AACCAGAGAG AATCAACAGA 960

TCAATGACAT AGGATCCGAA GTGCAATGAT AGTCACTTCT AGTTTGGCAT TTCACAAACT 1020

CTGNACAGCA AGGTATTGGT AGGTTACTCA ATTTCAAAAG GGCCCCATGG CCAAATATGT 1080

TTAGGAACCG CTGTTTGNAT TTCTTTTTTT GGAGACGCAT TGTATATAAT ATATGTCAAA 1140

GGCTTTCGGA ATTCCTGCAG GAAAGAAATC AGCTTTGTTA AATCCNAAAA AAAAAAAAAA 1200

AAAAAAATAG ACTCG 1215

(2) INFORMATION FOR SEQ ID NO: 60:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 478 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 60:

ATTTCTTATG ACATGGGGGT TTGAATTGGT TGGCAAATGT TTAATTTTAA TATCCATAAT 60

CAGTGAGGTC CTGCTGGCTG TAATCATTAA TTGTGAAATC TAAGGAGCTT AGTTCATGGC 120

TCTAGAATTT CACAGAAAAR TGYGMTATGA TACGAGCATT AAGTTTATTT CTTCTGATCT 180

TTGATGCAGC TTTGTTCAGT TTATCTGTTT TTGTATTTAT TGGTCATCTA CTTCCCATGC 240

CAAAAGGGAC TGGTCTACAT AGCTGCGCTA AACACCTGAT CAAATCACTA AAAGAAAATG 300

TGTTACCTCT AATGAATTAT CCTGATTGTA AGTTAAAAAT CAATATTTCC CCGTAGTGAG 360

GTTTGCTTTT TAAAAAGAAK KCTTAAAAAA AAAAAAAAAA AAACGAGTTN AAGAAAAGGA 420

AGCAAGCTCA GGTAAGGTGC ACACATTGGG CTAAGGAAGC TAGAGCCTGT GGAGANGC 478

(2) INFORMATION FOR SEQ ID NO: 61:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 618 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 61:

TATGACCTTG ATAACCCCAA GTTNGAAATT AACCTTCANT AAAGGGAACA AAAGCTGGAG 60

TTCGCGCGCT TGCAGTTCGA CACTAGTGGA TCCCAAAGAA TTCGGCACGA GTCATAATGA 120

GCTACTAGGT AAGCCTTCTG GGACTTTCAG ATATTTTGGG GAAGATTGAT TTTTGTTCTT 180

ACATGCTGTG GACCCTTGGC CATCAAATGG TATGGGGAAG CTCATCCGTC TGTCTGTGAT 240

GGTCATGTCA GTCAGGCGTC TTTTTAGTAT TTACTGGGTG CTCAGTACTG TGCCAGATGC 300

TGTCGGGAGC CGTGGTGGTA TGGAGGAGGA GTGCTCCAGA GGACTCTGCT GTGTGGCAGG 360

CCAGCATAAA CAAGCCAAGG GGAAAAGGCA GGCATGGAAT AAAGGGGGAG AATACCAGTG 420

TGTGACTTAC TGCTGACTGT GTGGATTAGC CTATCAGCAG TAATCAAGCA GGGCGGAGGG 480

CATTATCTTT GAGCCAGAAG AGTGAGCACT GGSCCGAGGG TGGAGCATCA AGAGGGGGTG 540

TAGGACCNCA AGGCTTCTTN CNGGGGAGAC AACGTCAATA AGCNGTCAGT AGTCACCGAC 600

AGTTTTGGGA AGCAAGGG 618

(2) INFORMATION FOR SEQ ID NO: 62:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 751 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 62:

TCGACCCACG CGTCCGAGGA GCTGGACTTC TGAGACAGCC ATTCTCCTTG CATAGCACTG 60

TCTGCTGCTA CAGCTCATAG AAGTCAACAA TTTTCTTCAA CACTGGTAGG CAGCCTCTAA 120

ATGGCCCTGA TCACCCTCAC CTCCTGCCAT TCACACCNNT GTAAAATTCC ACCCCTGGAC 180

CTAGTGACTC ACTTCTAACA ANGAGAATAC AGCAAAAGTA ACATCGCTTC TGAGGTGAGG 240

CTACAAGGAG ACTACGATGC CTGCCTTGGT CACCCTTCTC CTGCTCTTTC CATTGCTCCC 300

TCTGATGGAA GCCAGTTGCC ATGTGATGAG GTGCCCTATG GAGAGGCCCA CGTGACAAGG 360

TATTGTAAAA AGCCTCTGAC CAATAGCCAT CTAGAAACGG AGGCCCAGTC CAGCAGCCTC 420

TGAGATGAAT CCTGCCAACC TGAGCTTGGA GACAGATTCT CTCCCTATCC TGCCTTGGGA 480

TGATCACAGC CACCACCAAC ACCTTCACTG CCTGGTGAGA GGCCAAGCCA GTGAACCCAA 540

GGTAAACTGG ACAGAATCCT GACCCACAGA AACTGAGATA ATGTTTGTTA TTTTAAGCTG 600

CTCAGTTTGT TACAGAGCAA TAGATAACTA ACTCAAACAC CATAAAATTC TAATATTTTA 660

TTCTATCACA CAAACCAGGT AATACCAAGT AAATGCCATT ACTATACACA TATTTTTGTA 720

ACACAATTAC ATGTGATTTT TTAAGAAGGC T 751

(2) INFORMATION FOR SEQ ID NO: 63:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 780 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 63:

```
CNGNCAGTCA CNGTCCCCGA TTCCCGGGTC GACCCACGCG TCCGGGTTGG CAACTCCTGA    60
GGCCTGCATG GGTGACTTCA CATTTTCCTA CCTCTCCTTC TAATCTCTTC TAGAGCACCT   120
GCTATCCCCA ACTTCTAGAC CTGCTCCAAA CTAGTGACTA GGATAGAATT TGATCCCCTA   180
ACTCACTGTC TGCGGTGCTC ATTGCTGCTA ACAGCATTGC CTGTGCTCTC CTCTCAGGGG   240
CAGCATGCTA ACGGGGCGAC GTCGTAATCC AACTGGGAGA AGCCTCAGTG GTGGAATTCC   300
AGGCACTGTG ACTGTCAAGC TGGCAAGGGC CAGGATTGGG GGAATGGAGC TGGGGCTTAG   360
CTGGGAGGTG GTCTGAAGCA GACAGGGAAT GGGAGAGGAG GATGGGAAGT AGACAGTGGC   420
TGGTATGGCT CTGAGGCTCC CTGGGGCCTG CTCAAGCTCC TCCTGCTCCT TGCTGTTTTC   480
TGATGATTTG GGGGCTTGGG AGTCCCTTTG TCCTCATCTG AGACTGAAAT GTGGGGATCC   540
AGGATGGCCT TCCTTCCTCT TACCCTTCCT CCCTCAGCCT GCAACCTCTA TCCTGGAACC   600
TGTCCTTCCT TTCTCCCCAA CTATGCATCT GTTGTCTGCT CCTCTGCAAA GGCCAGCCAG   660
CTTGGGAGCA GCAGAGAAAT AAACAGCATT TCTGATGCCA AAAAAAAAAA AAAAAAAACC   720
GCGGCCGAAA GCTTATTNCC CTTTAAGTAA GGGGTTAATT TTTAGCTTGG GCACTNGGCC   780
```

(2) INFORMATION FOR SEQ ID NO: 64:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 588 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 64:

```
TTCCGAATTA ATCGACTCAC TATAGGAAWT GCCGTCGCCA TGACCCGCGG TAACCAGCGT    60
GAGCTCGCCC GCCAGAAGAA TATGAAAAAG CAGAGCGACT CGGTTAAGGG AAAGCGCCGA   120
GATGACGGGC TTTCTGCTGC CGCCCGCAAG CAGAGGGACT CGGAGATCAT GCAGCAGAAG   180
CAGAAAAAGG CAAACGAGAA GAAGGAGGAA CCCAAGTAGC TTTGTGGCTT CGTGTCCAAC   240
CCTCTTGCCC TTCGCCTGTG TGCCTGGAGC CAGTCCCACC ACGCTCGCGT TTCCTCCTGT   300
```

AGTGCTCACA GGTCCCAGCA CCGATGGCAT TCCCTTTGCC CTGAGTCTGC AGCGGGTCCC 360

TTTTGTGCTT CCTTCCCCTC AGGTAGCCTC TCTCCCCCTG GGCCACTCCC GGGGGTGAGG 420

GGGTTACCCC TTCCCAGTGT TTTTTATTCC TGTGGGGCTC ACCCCAAAGT ATTAAAAGTA 480

GCTTTGTAAT TCCAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA 540

AAAAAAAAAA AAAAAAAAAA AAAANNCGGG GGGGGGCCCC CCCCCCC 588

(2) INFORMATION FOR SEQ ID NO: 65:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 774 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 65:

TTTAAAGATG AAGAAATGAC AAGGGAGGGA GATGAGATGG AAAGGTGTTT GGAAGAGATA 60

AGGGGTCTRA GAAAGAAATT TAGGGCTCTG CATTCTAACC ATAGGCATTC TCGGGACCGT 120

CCTTATCCCA TTTAATTAAT TTCTCTGACA ATTCAATTAT TTTCTGTTAT TAATGTTGCC 180

ACTGCTTTCT GTTTGTCTGC ACTTTCTTGA TAAATATTTG CTATCGTTTT ACTCCAGTCA 240

TTCGATGTTG CTGAGATTTA CATATGACTC TTGTCAACAT CTCATCTTTT GACCCAATCT 300

TATTCATTTA ATAAGAGGTC TCATTCATTT GCATGGAAAA ATGCTCATTG TATATTGCAA 360

AGTGAAAATA ACGAGTTGCA AAACAGTGTA TACATATATG TGTGTATATA TGTACACTTT 420

ATTTGTACAT TTCTATGTGA CATAATGCAA AGGAAAGTGT CTGATTTTAT TATACACCAA 480

AGGTTAACAG TGAATCTCTG TGTGATCTCT TTTTTTTTCT TTTTGCCTAT CTGCATCTTC 540

TCACTTGCCA AAAAATGAAT ATATGTTTAT GTGTGTATAT TACTTGTGTC ACAAAAAACC 600

CTAAAGTAGA CAGTAAAAGA ACTTGTCAAT CGCCTTTGGA AGGCAATGAA ACACTTAATA 660

AACTCTCAAT AACAGAAGCG TAAAAATGAA ATGTAAACCT CCAATTACCT CTGGATCTCT 720

TAGCCAGAGT AATAAACTGG TAATTATTAC AGATAAAAAA AAAAAAAAAA AANA 774

(2) INFORMATION FOR SEQ ID NO: 66:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1866 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 66:

ACCCACGCGT CCGGTCCTCT TCTTCAGCAC ATGCCAAAGC TGTTCCTCAC GGCCTGTGAG 60
ACAAGAGCAT CTTGGATGTA GGACAATGGA AGAGTTAGAT GCCTTATTGG AGGAACTGGA 120
ACGCTCCACC CTTCAGGACA GTGATGAATA TTCCAACCCA GCTCCTCTTC CCCTGGATCA 180
GCATTCCAGA AAGGAGACTA ACCTTGATGA GACTTCGGAG ATCCTTTCTA TTCAGGATAA 240
CACAAGTCCC TTGCCGGCGC ANTCGTGTAT ACTACCAATA TCCAGGAGCT CAATGTCTAC 300
AGTGAAGCCC AAGAGCCAAA GGAATCACCA CCACCTTCTA AAACGTCAGC AGCTGCTCAG 360
TTGGATGAGC TCATGGCTCA CCTGACTGAG ATGCAGGCCA AGGTTGCAGT GAGAGCAGAT 420
GCTGGCAAGA AGCACTTACC AGACAAGCAG GATCACAAGG CCTCCCTGGA CTCAATGCTT 480
GGGGGTCTSG AGCAGGAATT GCAGGACCTT GGCATTGCCA CAGTGCCCAA GGGCCATTGT 540
GCATCCTGCC AGAAACCGAT TGCTGGGAAG GTGATCCATG CTCTAGGGCA ATCATGGCAT 600
CCTGAGCATT TTGTCTGTAC TCATTGCAAA GAAGAGATTG GCTCCAGTCC CTTCTTTGAG 660
CGGAGTGGCT TGGNCTACTG CCCCAACGAC TACCACCAAC TTTTTTCTCC ACGCTGTGCT 720
TACTGCGCTG CTCCCATCCT GGATAAAGTG CTGACAGCAA TGAACCAGAC CTGGCAGCCA 780
GAGCACTTCT TCTGCTCTCA CTGCGGAGAG GTGTTTGGTG CAGAAGGCTT TCATGAGAAG 840
GACAAGAAGC CATATTGCCG AAAGGATTTC TTAGCCATGT TCTCACCCAA GTGTGGTGGC 900
TGCAATCGCC CAGTGTTGGA AAACTACCTT TCAGCCATGG ACACTGTCTG GCACCCAGAG 960
TGCTTTGTTT GTGGGGACTG CTTCACCAGT TTTTCTACTG GCTCCTTCTT TGAACTGGAT 1020
GGACGTCCAT TCTGTGAGCT CCATTACCAT CACCGCCGGG GAACGCTCTG CCATGGGTGT 1080
GGGCAGCCCA TCACTGGCCG TTGTATCAGT GCCATGGGGT ACAAGTTCCA TCCTGAGCAC 1140
TTTGTGTGTG CTTTCTGCCT GACACAGTTG TCGAAGGGCA TTTTCAGGGA GCAGAATGAC 1200
AAGACCTATT GTCAACCTTG CTTCAATAAG CTCTTCCCAC TGTAATGCCA ACTGATCCAT 1260
AGCCTCTTCA GATTCCTTAT AAAATTTAAA CCAAGAGAGG AGAGGAAAGG GTAAATTTTC 1320
TGTTACTGAC CTTCTGCTTA ATAGTCTTAT AGAAAAAGGA AAGGTGATGA GCAAATAAAG 1380
GAACTTCTAG ACTTTACATG ACTAGGCTGA TAATCTTATT TTTTAGGCTT CTATACAGTT 1440
AATTCTATAA ATTCTCTTTC TCCCTCTCTT CTCCAATCAA GCACTTGGAG TTAGATCTAG 1500
GTCCTTCTAT CTCGTCCCTC TACAGATGTA TTTTCCACTT GCATAATTCA TGCCAACACT 1560
GGTTTTCTTA GGTTTCTCCA TTTTCACCTC TAGTGATGGC CCTACTCATA TCTTCTCTAA 1620
TTTGGTCCTG ATACTTGTTT CTTTTCACGT TTTCCCATTT CCCTGTGGCT CACTGTCTTA 1680
CAATCACTGC TGTGGAATCA TGATACGACT TTTAGCTCTT TGCATCTTCC TTCAGTGTAT 1740

TTTTGTTTTT CAAGAGGAAG TAGATTTTAA CTGGACAACT TTGAGTACTG ACATCATTGA 1800

TAAATAAACT GGCTTGTGGT TTCAATAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA 1860

AAAAAA 1866

(2) INFORMATION FOR SEQ ID NO: 67:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1152 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 67:

CTCAAGGATG TAAAGGCTCT GCAGATTTCG GGAGGCCTGT CTCCCAGCAC CTGATGGGAC 60

ACTTTTTGCC CCACTGTAAA TTCTGGGTGT ATCCTCCACT GTATGCTGTC ACCCCAAGGG 120

CAAGCACTGC ATCTGCTTAG TGAAGGATTT ATTGTTCGGA AGATACATTT TCCCCTTKAG 180

CAGAGAGTGG CGTATCCTGG CAGTCTTCGG TGAGCCAGTT GTACCAGGAT TATGAAATGC 240

AGATGTTTAC TGTGTCATTG TTGCTGTCAT TGCTACTGAG GAGTACTGAC CAGAATCATC 300

TGCAACTYTT AGTTGGCAGA GAGGACCACT ATGGCGGGTA GCTCTTTTCT TTCCTGCCAT 360

TGTGGGGATG ATTCCAGGCC AAAGATGATG GARAAGTATG GAAATCATCT GAAAGGTTGA 420

AGCTTGGCAC GTGAAGCCAT TCATGACTTT GTAAGGCAGT TTTGCTGAAG GCCAGTTCTG 480

CCCTGGGAGG GACGGAGGTG AATCCTCCTG AGTACCTGTG GTTTTCTTAC TTCCTGCTGA 540

ATTTACCTAA GTGCCTGTTG TTTGCTTGCT GTGGAGGCTT TCTGGTATTT CATTTCAGGT 600

GCAGATGCCT TCACTTTCCC ACCRAAAAAA CCCCMACCAA ACCTAAGACC TTACTGCAAC 660

TAAGTYTNCC AAGTACTTTT TAACCCAATG GGATGAACAG CCTGTGGTCT GCTCAGATCA 720

CCCTGAGTGC GTGTGAGAAG GCMTNGGCTT TGCCAGGAAA TCCAGGAAGG CAGGGCCGGG 780

CTGTGTTGGA AGCTGGCTTA GCTGGTGGGG CAGCCTTATT TCAATTAAAA GGGCATTGAC 840

TGGGAGCAGC AGTCCTGGAG TTTGTTGCAT TTCCTATTGC CCTCAAAATG AGAAACCAGG 900

AAAATAGCAG ATTGGAGCCT TCGAGAAGGC AGTAAATGGC TGTTTTTATT GACAAAAGGA 960

AAACATTTTA CTGCCATCTC ACTGATGGCA TCTCACTGAC TTAAAATGAA GGCANGTTGT 1020

AGTAAAAAAA AAAGTCTACA TTTTTCCACC GCCACGTTCT TATATCCTGT TTGTCAGCCA 1080

CTGCTCANAA GGGCATGTTG TCTTGCGGAN TANAGGCGCT CTCCTTCCCT CGTTTTCCCT 1140

ATAGGTTGGG TG 1152

(2) INFORMATION FOR SEQ ID NO: 68:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2483 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 68:

```
ACCAGGCGGT GCGCTGGGGG CGGGAGCAGC GCGKAGCCCG GCTCGGCCAC ACCGATCGCC      60
CGCCGCCATG GGCTCCTCGC AAAGCGTCGA GATCCCGGGC GGGGGCACCG AGGGCTACCA     120
CGTTCTGCGG GTACAAGAAA ATTCCCCAGG ACACAGAGCT GGTTTGGAGC CTTTCTTTGA     180
TTTTATTGTT TCTATTAATG GTTCAAGATT AAATAAAGAC AATGACACTC TTAAGGATCT     240
GCTGAAASCA AACGTTGAAA AGCCTGTAAA GATGCTTATC TATAGCAGCA AAACATTGGA     300
ACTGCGAGAG ACCTCAGTCA CACCAAGTAA CCTGTGGGGC GGCCAGGGCT TATTGGGAGT     360
GAGCATTCGT TTCTGCAGCT TTGATGGGGC AAATGAAAAT GTTTGGCATG TGCTGGAGGT     420
GGAATCAAAT TCTCCTGCAG CACTGGCAGG TCTTAGACCA CACAGTGATT ATATAATTGG     480
AGCAGATACA GTCATGAATG AGTCTGAAGA TCTATTCAGC CTTATCGAAA CACATGAAGC     540
AAAACCATTG AAACTGTATG TGTACAACAC AGACACTGAT AACTGTCGAG AAGTGATTAT     600
TACACCAAAT TCTGCATGGG GTGGAGAAGG CAGCCTAGGA TGTGGCATTG GATATGGTTA     660
TTTGCATCGA ATACCTACAC GCCCATTTGA GGAAGGAAAG AAAATTTCTC TTCCAGGACA     720
AATGGCTGGT ACACCTATTA CACGTCTTAA AGATGGGTTT ACAGAGGTCC AGCTGTCCTC     780
AGTTAATCCC CCGTCTTTGT CACCACCAGG AACTACAGGA ATTGAACAGA GTCTGACTGG     840
ACTTTCTATT AGCTCAACTC CACCAGCTGT CAGTAGTGTT CTCAGTACAG GTGTACCAAC     900
AGTACCGTTA TTGCCACCAC AAGTAAACCA GTCCCTCACT TCTGTGCCAC CAATGAATCC     960
AGCTACTACA TTACCAGGTC TGATGCCTTT ACCAGCAGGA CTGCCCAACC TCCCCAACCT    1020
CAACCTCAAC CTCCCAGCAC CACACATCAT GCCAGGGGTT GGCTTACCAG AACTTGTAAA    1080
CCCAGGTCTG CCACCTCTTC CTTCCATGCC TCCCCGAAAC TTACCTGGCA TTGCACCTCT    1140
CCCCCTGCCA TCCGAGTTCC TCCCGTCATT CCCCTTGGTT CCAGAGAGCT CTTCTGCAGC    1200
AAGCTCAGGA GAGCTGCTGT CTTCCCTCCC GCCCACCAGC AACGCACCCT CTGACCCTGC    1260
CACAACTACT GCAAAGGCAG ACGCTGCCTC CTCACTCACT GTGGATGTGA CGCCCCCCAC    1320
TGCCAAGGCC CCCACCACCG TTGAGGACAG AGTCGGCGAC TCCACCCCAG TCAGCGAGAA    1380
GCCTGTTTCT GCGGCTGTGG ATGCCAATGC TTCTGAGTCA CCTTAACTTT GAACCATTCT    1440
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TTGGAATTGG CGTGGTATAT TTAACCACGG GAGCGTGTCT GGAAACGCAA ACTATCATTA    1500
ATTTCATACT AGTTTGTACC GTATCTGTAG GCATCCTGTA AATAATTCCA AGGGGAAAAC    1560
TAAACGAGGA CGTGGGTTGT ATCCTGCCAG GTTGAGTGGG GCTCACACGC TAGGGTGAGA    1620
TGTCAGAAAG CGCTTGTATT TTAAACAACC AAAAAGAATT GTAAGGGTGG CTTGCTGCCA    1680
GGCTTGCACT GCCGTTCCTG GGGGTGTGCA TCTTCGGGAA AGGTGGTGGC GGGGCGTCCA    1740
CTAGGTTTCC TGTCCCCTGC TGCTCCTTCC GTAAGAAAAT GAAATATTCT ATGCCTAATA    1800
CTCACACGCA ACATTTCTTG TACTTTGTAA GTCGTTTGCG AGAATGCAGA CCACCTCACT    1860
AAACTGTAAA CGGTAAAGAG ATTTTTACTT TTGGTCTCCG TGAGTCGCAT CTCTACTAAG    1920
GTTTACACAG GAATTCCACC TGAAGACTTG TGTTAAAGTT CTACAGCGCG CACTGTTAAC    1980
TGAACGTCTT TTTCTTCAGC CTATACGCGG ATCCTTGTTT TGAGCTCTCA GAATCACTCA    2040
GACAACATTT TGTAACTGCT GCTGTTGCTT TCTACATACA CCTTATAAAG TGACATTTCA    2100
AAAGAAATAA GGTGCCACAG TTTTAAACCA GAAGGTGGCA CTCTGTGGCT CCTTGTAGTA    2160
TTATAGCTAT ACTGGGAAAG CATAGATACA GCAATAAAGT ACAGTAATTT TACTTTTTTT    2220
CTTGTGTTAC ATCTAAATTA CAACCCTTAA TTGCCACGTG TGCACTTACT ACTCTCCAGT    2280
ATGTCTTATT ACTCTCCAGT ATGTCACGCA TCTTTAACTT TTCACGTCCT ATGTTTGCTT    2340
TCTCCCATTT TTAAGAGATG GTAAGTTAAC TGGAATTGAT TTACTGAATG AAATTAAATG    2400
CAGATATCCC TGTTTTTGAA ATAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA    2460
AAAAAAAAAA AAAAAAAAAA AAA                                            2483
```

(2) INFORMATION FOR SEQ ID NO: 69:

(i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 536 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 69:

```
GAGAAATGGA GCTTTGTTAG ATAAAAATTT TTTCAACGCA AACAGTCATT TTCCAGTGAA      60
AGGAGAGCGT ATCCGCCGTA GGATGGACTT AGATCGTGTA AAAGCTGAGG CCACCGAGGA     120
TATAACCTCC GGGGTCCTTT GCCTCCTTTT CCTTAGACTC CCTCCAAACT CGTGTATCTT     180
TCCTTCAGCA GTACTGGGCT CCACGCGAAC CTAGTCCTTT GTCTTTACCC TATTACCTTT     240
CATAACATCC TAGTTGAAAA GTARTTATTC AACCGCGTTT GAAAATGAGA ACAGGTTCAC     300
AGARGCTAGG TTACTTGCGA AGGTCGTTCA ATTAGTAACG AGTAACGCCA GGACTGCCAG     360
```

TTTCTTGCTT CCGAATTCTC ATGGTAGCTT TCACCARGCT CCCCGTCMAA TGCTAACGTC 420

AACTACTGAA CTAGATTAGC AAAAAGGTCT TTTAACAGAA TTCCTGGTTT TCAGAGAGAG 480

TTTCTTTCAT GAAGCGCCCC ATTTCTACAG AGGAAAATAA ACTCCAAGCA GCCAGT 536

(2) INFORMATION FOR SEQ ID NO: 70:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 865 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 70:

CCACGCGTCC GGCCTTTCTT GGCCAGAGGC GCCGGTTGGA CTCACGGGCG GGGCATGATG 60

GGTAACAGGA CCGGTGGGGT CCCCAGGAAG TCCTAGAGGG GGTCGGGGTT TGGGTGGACA 120

AGCTTTCCTC GTCCTCTCCC GACAGAGCTG ACGTGTCCTG GGTTCCACCG GGAGCGGGCA 180

TTTCCACCGG ACGGGAGGGT TCGGGGTGTC CGGGGCTGGG GAATACGTAG GGGTTGCCGC 240

GCGGTGTGGG GAGTTGGGGC GTGTGGCTGC AGTCCCGGGA GTTCTTGGAG GGGGTCGGCC 300

CACCGAGCTT CCGGACCGGC TGATCTGCCC GTAGCTTGCC GGANGGARGG CGGAGCTGAC 360

TCTCCGTCCC TTCTCCCATC CCCTCCAGTG GTGGGTACGG GCACCTCGCT GGCGCTCTCC 420

TCCCTCCTGT CCCTGCTGCT CTTTGCTGGG ATGCAGATGT ACAGCCGTCA GCTGGCCTCC 480

ACCGAGTGGC TCACCATCCA GGGCGGCCTG CTTGGTTCGG GTCTCTTCGT GTTCTCGCTC 540

ACTGCCTTCA ATAATCTGGA GAATCTTGTC TTTGGCAAAG GATTCCAAGC AAAGATCTTC 600

CCTGAGATTC TCCTGTGCCT CCTGTTGGCT CTCTTTGCAT CTGGCCTCAT CCACCGAGTC 660

TGTGTCACCA CCTGCTTCAT GTTCTCCATG GTTGGTCTGT ACTACATCAA CAAGATCTCC 720

TCCACCCTGT ACCAGGCAGC AGCTCCAGTC CTCACACCAG CCAAGGTCAC AGGCAAGAGC 780

AAGAAGAGAA ACTGACCCTG AATGTTCAAT AAAGTTGATT CTTTGTAAAA AAAAAAAAAA 840

AAAAAAAAAA AAAAAAAAAA AAAAA 865

(2) INFORMATION FOR SEQ ID NO: 71:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 932 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 71:

```
TCATCATATA CAAAGTTTTT CGTCACACTG CAGGGTTGAA ACCAGAACTT AGTTGCTTTG      60
AGAACATAAG GTCTTGTGCA AGAGGAGCCC TCGCTCTTCT GTTCCTTCTC GGCACCACCT     120
GGATCTTTGG GGTTCTCCAT GTTGTGCACG CATCAGTGGT TACAGCTTAC CTCTTCACAG     180
TCAGCAATGC TTTCCAGGGG ATGTTCATTT TTTTATTCCT GTGTGTTTTA TCTAGAAAGA     240
TTCAAGAAGA ATATTACAGA TTGTTCAAAA ATGTCCCCTG TTGTTTTGGA TGTTTAAGGT     300
AAACATAGAG AATGGTGGAT AATTACAACT GCACAAAAAT AAAAATTCCA AGCTGTGGAT     360
GACCAATGTA TAAAAATGAC TCATCAAATT ATCCAATTAT TAACTACTAG ACAAAAAGTA     420
TTTTAAATCA GTTTTTCTGT TTATGCTATA GGAACTGTAG ATAATAAGGT AAAATTATGT     480
ATCATATAGA TATACTATGT TTTTCTATGT GAAATAGTTC TGTCAAAAAT AGTATTGCAG     540
ATATTTGGAA AGTAATTGGT TTCTCAGGAG TGATATCACT GCACCCAAGG AAAGATTTTC     600
TTTCTAACAC GAGAAGTATA TGAATGTCCT GAAGGAAACC ACTGGCTTGA TATTTCTGTG     660
ACTCGTGTTG CCTTTGAAAC TAGTCCCCTA CCACCTCGGT AATGAGCTCC ATTACAGAAA     720
GTGGAACATA AGAGAATGAA GGGGCAGAAT ATCAAACAGT GAAAAGGGAA TGATAAGATG     780
TATTTTGAAT GAACTGTTTT TTCTGTAGAC TAGCTGAGAA ATTGTTGACA TAAAATAAAG     840
AATTGAAGAA ACACATTTTA CCATTTAAAA AAAAAAAAAA ACTNGAGGGG GGCCCGGTAC     900
CCAAATCGCC GCATAGTGAT CGTAAACAAT CT                                   932
```

(2) INFORMATION FOR SEQ ID NO: 72:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 996 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 72:

```
CGCCTGGCAC CATGAGGACG CCTGGGCCTC TGCCTGTGCT GCTGCTGCTC CTGGCGGGAG      60
CCCCCGCCGC GCGGCCCACT CCCCCGACCT GCTACTCCCG CATGCGGGCC CTGAGCCAGG     120
AGATCACCCG CGACTTCAAC CTCCTGCAGG TCTCGGAGCC CTCGGAGCCA TGTGTGAGAT     180
ACCTGCCCAG GCTGTACCTG GACATACACA ATTACTGTGT GCTGGACAAG CTGCGGGACT     240
TTGTGGCCTC GCCCCCGTGT TGGAAAGTGG CCCAGGTAGA TTCCTTGAAG GACAAAGCAC     300
GGAAGCTGTA CACCATCATG AACTCGTTCT GCAGGAGAGA TTTGGTATTC CTGTTGGATG     360
```

ACTGCAATGC CTTGGAATAC CCAATCCCAG TGACTACGGT CCTGCCAGAT CGTCAGCGCT 420

AAGGGAACTG AGACCAGAGA AAGAACCCAA GAGAACTAAA GTTATGTCAG CTACCCAGAC 480

TTAATGGGCC AGAGCCATGA CCCTCACAGG TCTTGTGTTA GTTGTATCTG AAACTGTTAT 540

GTATCTCTCT ACCTTCTGGA AAACAGGGCT GGTATTCCTA CCCNGGAACC TCCTTTGAGC 600

ATAGAGTTAG CAACCATGCT TCTCATTCCC TTGACTCATG TCTTGCCAGG ATGGTTAGAT 660

ACACAGCATG TTGATTTGGT CACCTAAAAA GAAGAAAAGG ACTAACAAGC TTCACTTTTA 720

TGAACAACTA TTTTGAGAAC ATGCACAATA GTATGTTTTT ATTACTGGTT TAATGGAGTA 780

ATGGTACTTT TATTCTTTCT TGATAGAAAC CTGCTTACAT TTAACCAAGC TTCTATTATG 840

CCTTTTTCTA ACACAGACTT TCTTCACTGT CTTTCATTTA AAAAGAAATT AATGCTCTTA 900

AGATATATAT TTTAYGTAGT GCTGACAGGA CCCACTCTTT CATTGAAAGG TGATGAAAAT 960

CAAATAAAGA ATCTCTTCAC ATGARAAAAA AAAAAA 996

(2) INFORMATION FOR SEQ ID NO: 73:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 785 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: double

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 73:

GGCACGAGGG GCTTTGCGTA CACAATAGCT GCTAGGAGTA CCCAAAGCCT GARTACARCC 60

TGCTGGTGTC ATGGCCACGT GTGAGCAGGC CAGCGTCAMA CGGCTCGCTG TGACCCGTCC 120

CGRAGACTGA AATGGGCCTG GGTCTTCTCC TKGTCCTGTG ATWAAAGTCC TCTCTTGAAA 180

GTGGAGAGCA AAGGCACACA GAGGTGCGCG CTCACAAGAA TTCCTCCCGG TGACTGGGTA 240

ATCAATGTTA CTGCTGTTTC CTTTGCAGGA AAGACCACAG CAAGATTCTT TCATTCGTCT 300

CCTCCTAGCC TGGGGGACCA GGCTCGAACT GACCCTGGAC ATCAAAGGAG GGATTATGTG 360

GCTGCTAAAG CCATCGGCCC ACAGCCCTGT TCACRTCTTG GTGCTTCTCT TTCCCAGAGG 420

CTGGTCCCAG CCAGGCACAC ACAAAAGGCA GATTCTCGTA AACSCAGCCT CCCTCCCTGG 480

AGGCTGCCTC CTGCCCTGGA TCTGGAGTGG AGCTGCTCTG AGATTTTGAG TTCTTCTGCA 540

GAGATGATTA AATATATCCA AGAGACATTG GAAAACCTGC TGAACATTTT ACATTGGTCT 600

GCTCAGCACA TGGCTGGATG CGGATATTTC TATAATTCCA GAAAGTCACA CAGCTCCTCT 660

GTATGAGACC AGTGGGCGCC ATTTAAAAGA ACAGGATGAG AATCTAAGAT ATATTATTAA 720

TAAATGTAAT GGATTTTTTT TTTGTAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA 780

AAAAA 785

(2) INFORMATION FOR SEQ ID NO: 74:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1069 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 74:

```
TCCTCACCAT TCCCCTAGGN CAGGTCCCTG CAGGTCCCAC ACTTCTCCCA GGTCCCTAAA     60
CTTGGGTCGG TCCTTTCCCT GGAGTAGCTG GNTCCTCCAG TCGAGGTCCC TGTTCAGTCG    120
GTTCTTAGGC TCCTGCACAT GAAGGTGTGT GCCTGTGGTG TGTGGGCTGC TCTAGGAGCA    180
GATACAGGCT GGTATAGAGG ATGCAGAAAG GTAGGGCAGT ATGTTTAAGT CCAGACTTGG    240
CACATGGCTA GGGATACTGC TCACTAGCTG TGGAGGTCCT CAGGAGTGGA GAGAATGAGT    300
AGGAGGGCAG AAGCTTCCAT TTTTGTCCTT CCTAAGACCC TGTTATTTGT GTTATTTCCT    360
GCCTTTCCGA GTCCTGCAGT GGGCTGCCCT GTACCCTGAA CCTCATGAGC CTCTAAGGGA    420
AAGGAGGAAC AATTAGGACG TGGCAATGAG ACCTGGCAGG GCAGARTACA AGCCCAGCAC    480
CAGTGTCCCA GCCTTACTGG GTCCTTACCC TGGGCCAAAC AGGGAGGGCT GATACCTCCT    540
TGCTCTTCCT AGATGCCCAC CTCCTACAAT CTCAGCCCAC AAGTCCTCTC CACCCTAGGG    600
GGCTTGCTGC ATGGCAATAA CTCATAATCT GATTTGGAGG TTTGCCCTTT ACAGGGGCAG    660
ATTTTCTGCT CAGTTCAACA ATGAAATGAA GAGGAACTCC CTCTTTCTAC AGCTCACTTC    720
TATCAGAGGC CCAGGTGCCT CAGAGCCACA TTGAGTTGCT TTTTCTGGGA TGAGGAAGTA    780
GGGTTAAACT CCCCAGTTTC CTGAGGGAGG CTCCTGACAG GTGCCCTTTG TCAGACCCTA    840
CCACAGCCTG GATAGGCAGC CACATTGGTC CTCGCCCTTG CTCGGNACTC CGTGGTGGTC    900
CTGCCCTTCT CCCTGCATGC CTGTGGGTCT GCTCTGGTGT GTGAAGGTCG GTGGGTTAAC    960
TGTGTGCCTA CTGAACCTGG CAAATAAACA TCACCCTGCA AAGCCAAAAA AAAAAAAAAA   1020
AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAA               1069
```

(2) INFORMATION FOR SEQ ID NO: 75:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 831 base pairs
(B) TYPE: nucleic acid

(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 75:

GGACATTAGA TCACTGTGGA CCTAAAACAA ACAAACAACT ATAAGGAAAA TGGCATTAGA 60

AATGGTCTGG GGATCAGTTT ATCACTGCAG TTGTTACATC ACCCCATGGT CTAAAATACA 120

GAGCTTTAGT CTGTCTCTGT TTCAGTTCAT TTTACAGGAG GTGAACATCA CACTTCCAGA 180

AAACTCTGTC TGGTATGAAA GGTATAAATT TGATATTCCT GTCTTTCACT TGAATGGCCA 240

GTTTCTGATG ATGCATCGAG TAAACACCTC AAAACTTGAA AAACAGCTCC TGAAACTTGA 300

GCAGCAAAGT ACTGGARGCT GACTGATGCC CTCATGATTT TCCACCCTCT CTTCCCATAA 360

AGCATCTTCC TAAGGAAATG AMCATGGCCT GATACTCATT TTGTCACTTG TACAGAGCCC 420

TAAGGATGTT CTGAATTCAG TGGTGCCAAA TAAATGTTGA CATTCCCCTT TTGGTTGATG 480

GAAGTATCAG TGTGGGAACT GTTTGCTTAA TGGCATTTTA TAAAATAAKA AKAKCATATT 540

AGCAGGGAGG GAGATGATGG AGGGAGGGAG AAGTCCATTT GTCTTATTTA TCCTTTTTGT 600

ATTAATAGAG AAGCACTTCA CAGTCACTGG CAATGCCATT TATAGGAAGA AGGTTCTGCA 660

TTCCTGCTGC TCCCGGAGGG CTTAACTTTT TAATGAAAGA ATAAATGCTC TTCCACTCAG 720

TAGATAAAGT GAAATGTGAA TTGTTAATAA CTGTGCACGG TCAATAAAGC GATGTTTTAA 780

GGAATACAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAACTCG A 831

(2) INFORMATION FOR SEQ ID NO: 76:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 590 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 76:

TATATATAGA CNGTTAATAG TCGTGANTGN TGTGNACGAA CATTAACGGA AGTAGCATGT 60

AGCCAGTCGA ATAACNTATA AGGACAAAGT GGAGTCCACG CGTGCGGCCG TCTAGACTAG 120

TGGATCCCCC GGCTGCAGGA TTCGGCACGA GCTGCCAGGT GAGGAGCAGA GAGACTGTTC 180

CCTTGGGTGG AGAGGTGTGG GCATGAGAGC CACCCATTGC CAAGCAGCAA GAATGTTCGT 240

GCTTTTTTCC CTTCCAAAAT ATGCAGGGCT CAGGCTCCCA ATTCCGGGCC TGTCTGCTTT 300

GCTTGTGTTT CTCCTGTCCC TGTTCTCCCG GAGGGCCCAG GTGGAACTCA CGACAGGGAG 360

GGAGACGCTT CCCAAAAACC TGCAGGGCTA TTTCCCAGAA TTTGGTTTTC AAGTACAAAA 420

CTTTTTGTCC TGTAAGATAT ATGCAGCCTC ACAGAAGCAG CCTCTGCCTC CACTTTACCA 480

GCTACGTTTT TATCTTAAGC ACATGGGGCT CCCTTAGAAC TTACTCCACT GATTTAAAAA 540

AAAAAAAAAA AAACTCGAGG GGGGGCCCGG TACCCATTCG CCCTAAAAGT 590

(2) INFORMATION FOR SEQ ID NO: 77:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1274 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 77:

GAGCCACCAC ACCTGGCCTG GAAGGAACCT CTTAAAATCA GTTTACGTCT TGTATTTTGT 60

TCTGTGATGG AGGACACTGG AGAGAGTTGC TATTCCAGTC AATCATGTCG AGTCACTGGA 120

CTCTGAAAAT CCTATTGGTT CCTTTATTTT ATTTGAGTTT AGAGTTCCCT TCTGGGTTTG 180

TATTATGTCT GGCAAATGAC CTGGGTTATC ACTTTTCCTC CAGGGTTAGA TCATAGATCT 240

TGGAAACTCC TTAGAGAGCA TTTTGCTCCT ACCAAGGATC AGATACTGGA GCCCCACATA 300

ATAGATTTCA TTTCACTCTA GCCTACATAG AGCTTTCTGT TGCTGTCTCT TGCCATGCAC 360

TTGTGCGGTG ATTACACACT TGACAGTACC AGGAGACAAA TGACTTACAG ATCCCCCGAC 420

ATGCCTCTTC CCCTTGGCAA GCTCAGTTGC CCTGATAGTA GCATGTTTCT GTTTCTGATG 480

TACCTTTTTT CTCTTCTTCT TTGCATCAGC CAATTCCCAG AATTTCCCCA GGCAATTTGT 540

AGAGGACCTT TTTGGGGTCC TATATGAGCC ATGTCCTCAA AGCTTTTAAA CCTCCTTGCT 600

CTCCTACAAT ATTCAGTACA TGACCACTGT CATCCTAGAA GGCTTCTGAA AAGAGGGGCA 660

AGAGCCACTC TGCGCCACAA AGGTTGGGGT CCATCTTCTC TCCGAGGTTG TGAAAGTTTT 720

CAAATTGTAC TAATAGGSTG GGGCCCTGAC TTGGCTGTGG GCTTTGGGAG GGGTAAGCTG 780

CTTTCTAGAT CTCTCCCAGT GAGGCATGGA GGTGTTTCTG AATTTTGTCT ACCTCACAGG 840

GATGTTGTGA GGCTTGAAAA GGTCAAAAAA TGATGGCCCC TTGAGCTCTT TGTAAGAAAG 900

GTAGATGAAA TATCGGATGT AATCTGAAAA AAAGATAAAA TGTGACTTCC CCTGCTCTGT 960

GCAGCAGTCG GGCTGGATGC TCTGTGGCCT TTCTTGGGTC CTCATGCCAC CCCACAGCTC 1020

CCAGGAACCT TGAAGCCAAT CTGGGGGACT TTCAGATGTT TGACAAAGAG GTACCAGGCA 1080

AACTTCCTGC TACACATGCC CTGAATGAAT TGCTAAATTT CAAAGGAAAT GGACCCTGCT 1140

TTTAAGGATG TACAAAAGTA TGTCTGCATC GATGTCTGTA CTGTAAATTT CTAATTTATC 1200

ACTGTACAAA GAAAACCCCT TGCTATTTAA TTTTGTATTA AAGGAAAATA AAGTTTTGTT 1260

TGTTAAAAAA AAAA 1274

(2) INFORMATION FOR SEQ ID NO: 78:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1133 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 78:

AGGATTTTTC CTTGTTCAAC CAAAATCTGA GCATTCTTTC TATGTTGAAA ACACTGAAAA 60
ACTAATTTWA GTTAATGAAC TAGAAAGAAT ATTGATTTTW AAGAAACAGA AAAATACTAC 120
TTATTTTCCT TCTCAAATAA CGTTTCTTTC AAAAACTTCT GGCTGAAGTA TAACATGCTG 180
GTAGTTAACA TAAATCTTGT CTTTCTCTTG TTCTTTATCT TTCTTTGTTA TTTAGATGCT 240
TGTATAAATG TCTTTTGTTT TTATTAAGTG CCTAATTGAC AGAGCTTAAT TTGAAGAAGT 300
GCCCTAATTT ATTGACCACT TAAGAATTGC CTTTATTGGG GTATTTTATT TGTTCCTGCG 360
TCTTTTTGAT GTTGTTCAGT CTACTCATCC CTGTGAGTAT GTGTGGGGGA CAGCTGATAG 420
AAGGGAGGAG AGTGTGTCTA TGCTCAGGAT TGCCCTTTAG CCACTCAGCC AGAGATCCAC 480
AGGGAGCAAC AAGGACAGTT TCACATGCTT AGACTTTCTT GGAAGAAACA GTGAGGAGGA 540
GTAAGTCGTG AGTAGTGTCA AGCTGGATGT AGAATTGTCC TAAGGCAGTT GACCCCACCT 600
TCCAACATGT TTTCACTTTA TTTGCCCCTC CCTACATTTG GGTTAGGTTC CATTTGGATT 660
TGCAGCAATA ATGACTTTAT TTCTCTCTTG GTCAGGATTT GGCACATAAA ATCCTTTTAT 720
TATAGAACTA GCTATTTTAG TTACATAGTA ATGTAACTAA TGGAGAGATT TATAGAGAAT 780
TTTGKTTTTG CTGTCATATA TGTCCATTTT GGAGACAGAT ATGATAGAAC TAGAAATTAA 840
GTTGCATTTC TGCAAGTGCC ATTTGAATGA ACTTCAAGTA TCTTCTTAAT TATTAAATTT 900
TCTGATGAAG GCATTGTAAC AAATATATAG TATTATTAAA TCTAATTAAT ATTTGGAAAT 960
ATTAATAAAT AGGTATTTTA TTTACTGTAA AAAGTCAAAC TTCATTATGT AGATAAATCT 1020
TATTCTTTTC ATTCTTTCCC CTGTTTACAT CCTTTTTACA AAGCTTAGTC ACCAATTAAA 1080
GCTTTCCTAT CAAAAAAAAA AAAAAAAAAA ACTCGAGACT AGTTCTCTCT CCT 1133

(2) INFORMATION FOR SEQ ID NO: 79:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 661 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 79:

```
GAATTCGGCA CGAGGGGAAA AGGATGCTGA ACGAGAGCAG AAAGCCTCTT TCCTTTGCTT    60
CACGCCTTTC CAGTCTTTAT TTTAAACTCG GGTTCCCTTT CTGTGGTCGC AGCAACCTTT   120
ACTCCACCTG CACTGCTGCT CCTGGGGGCT CCCCAGGCCT CCCTCTGCCT TTCTACCCAG   180
TGGCTGACGG GATGCCTGTC TTGCCTGGAC GCACCACTGC TCTCCTGTCC CTCACCTTGG   240
CTTTTGCTGT GCCCTGCTCT GGGGTTGAAG CTGGCCCATG TGTCCCCCGG AGTCATGGCT   300
GCTCCTCCTG GGAGGCCTCT GTGTGCGTCA CGTCTTCCAC ACCTGGGGGC AGCTGGCGAG   360
CCCGTGCTCT GTTCCCCTCG GCTGCTTGGC ACAGAGYTGC AGCCTGGGAY TCTCCGTGGA   420
CCCAGACTGG GGATTTTGCC AGGGGGGCGA TGGGAGGAGC AGGTGCTTTG CCTGGCGGCT   480
GTGTCTGCAT TTCTGGACGC CCCAGAGCAC AGAAGTTGCC GGCACTTTGA GGTCTTCCTC   540
GGCATGTGCC AGATTACATG AGTGACGGCT GGGAATATGT TTTCTTTTTT GTAATGGAGG   600
CGTGTTTCAC ATATAGTAAA GCTCACCAAA AAGTAAAAAA AAAAAAAAAA AAAAAACTCG   660
A                                                                   661
```

(2) INFORMATION FOR SEQ ID NO: 80:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1378 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 80:

```
ATTGGGTACC GGGCCCCCCC TCGAAGTTTT TTTTTTTTTT TTTTAATGAA AGCTCTCAAA    60
TAAGCGATTT TATTCCTATC CATGATTGCA GACATTTACA AAACCATAAC ATCTGAGTTC   120
ACCTTAAAAA ATAACTTATA TAAAGCAGTG ATATACACAG CACAAAATAG TTCAGGGAGG   180
GGGCAGGAGC AACTTGTAAT AATTAAAATG TAAACGTGAA AAAAAGGATG GAATAAAAGT   240
CCCTACTTAT TTCTACTTAA GATGTCATGT GATAATATTT TACAATGTCC TGTGGGTCAA   300
TGTATGTATG TGTATATGTC TGTATAACAT ACACATATAC AGTACATTCT CTTTCCCACA   360
CATATACATA CACACATAAT TATTTGCAGT TCAGTTTAGG GCAATTCTAA TATGCCACTC   420
CGTACAGTTG TTTGAATCAC ATTTGGACCC GCTTTCTTCA CAAAAGAGGG GAGAGAGCAG   480
```

GAAATAAAAA GGTTGGTTTG GTGTGACTGA GATTCCTTTG TTTAACTGTA CACTGTGATG 540

AATAATTTTC TTCCGTAGTA GTTCTGTGAA GGGCTGACTC ACTGTGGTTT TCATGAGGAG 600

ACTTGGTAAT GGATCACACG CTCATTGTCA TGCTAGGGGA GTAACTCTCA CTCTGAAAAG 660

GATTTAAGAA ATTTCCCCCC ATTTCGCCAT CATCCCTTGG AGTGCCCGGT TGATTACTCA 720

GGCTCATATT ATTGGGAGAA TTCTTGGAAA TACTGTCCAT ATCTCCTGAG CCTAAAGAGC 780

CATTCATGTG ATGTGACTCC ATTCCTCCTA ATCCACCCAT GGGACCATCT GACCCAGGRC 840

CCATTGGAAA ATTAGGTCTG TTAGGTCCAG GAGGTACTGC ATTCATTAAA GTATACATGT 900

TATCACCAGA GTTGGTTGAA TCTGCTGGAC TAGGCATGAT GGGTGTTCCT GGTGGCCCTC 960

CACCTCCTGG AGGACCTACA TAATTCCCAG GAGATGCTGA GGAGTATGGT ATTGAATTGG 1020

CATTTGTTGG GTTTGGCCAA GGTCTACCAC CACCTGGACC CATGTTCATT CCAGGCATTC 1080

CAGGGCCACC TAAAGCATTC AGTGGGGGTC TCATTGCACC TCCATAGTTC TGTGGTCCTA 1140

AGGGCACCAT TCCTCTTGGA GGAGTCATTC TCTGCATTGG CCCACCCATA TTTGGATGTC 1200

CTTGTTGTCG AGTTGGATCC ATTCCACTGG GGAGTAATGG CTGACTTCCT GGGACACCTC 1260

CAAGTGCCTG ATTAGGTATC CTCAATGGGG GCCTTGGACC TCCAGGGTAC CGAGGTGACA 1320

TAAAAGGGTA ATCATGGAAG GCTTTTGCTT CACTTGAGTG TTCACATGTT TCACGTCT 1378

(2) INFORMATION FOR SEQ ID NO: 81:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1440 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 81:

ACTTTGTCCA AATGTGTCTG TCACATGTAG TCAGCTGNAG NAATTTAAAA TGAATTGCCA 60

AGTGAAGAGT CTGTGGATTA ATTGGCCGTT AATTAACAGG CTTTATCAAT GTGTCCTCAA 120

GGGAGAGGCC CAACCCTAAT TAAGGAGCTA AACTTCCTGA GTGAGGGGCT GTGAGGATGG 180

AGGTGGAGGA GGCATCTGGG GCGGGTGGTG GCCGGGCCAG CAGATGGCGC CTCCCTGGCT 240

GAGCTGCCCG CACCGCCAGT TCCCTCATTT CCACTCAGGA AGGCAGAGAA GGCAGAGTGA 300

TCTCCTCAAG GAAGAGCTTC CCCAGCCTTC GGGAGCAGCT GGCAGGGCGT CCGGGAATAA 360

GCCCTACACG CCGCCGCCTG CCTCCAACTC ACTAACCCTG CGCCTCTTGT CTTTCAGATT 420

CAACGCGTTC AACAGAAGCC ATCCCCAGCC CAGCTTAAAT TATAAAGATA GACAATAACT 480

CTGTTCCAAT CTGCGTGGTG CTTCTTTAGT AAATACTGTA CAGATTTTAC CATGGAGAAC 540

TTTTTTTTTA GTTTTTACCT TTTCTTAATT ACCCTTATTC CGAATGGACG AACACTTTCT 600
ACCACTGCTG ACCATTGTAA AATACCGTGT ATATAAATCC CATTGAAATA ATGCCCTGGA 660
ATAGAACATC TCAAATGCTG CTTAATTACA GACTCAGGTC GATTACTTGT ATTTCATGTA 720
ATGTTCCTCC AAGTTAGACA TCTGGTGCAA GACCAACCGG GAGACCATGG AATTGTCAAA 780
AGTACAAACT GACAGTGTGT ATATTTAATT TAAAGACTTA TTTAAAAACT CACAAGCTCT 840
CACCTAGACT TTGGAGAGCA GTCTGTTTTC TGTAATGTCT GATACTAGAA ACTAATTTGC 900
TTATTTTAGT TGTATTCAAG ATTTGAAGAT GTATTTTATA GACAAGTTCT GTTTTTGAAC 960
TTTGTGGAAC TGTTCCAATC AATCAATTTC CCAGTTATGA TGAGTATTTA CATTATGAAT 1020
GTATAACCCA GACATGATTT GTAAAGCCGA CAGTATGTTT CTATTACACA ACACTTTTTG 1080
ATACAGCGTC TCTTGTCTTC ACTGATACTG GAGTCTCCGT TGTCTGCNNG GTCCCTTCGA 1140
GTTTCTAGTT ACAGACACAA TCATACTGTG ATTTTATTTT TAATATGGAT ATGCTATCAA 1200
ACTGTGATAC ACTTATAATT CACTGGTCCT GCATCAGGAG ATGGAGTGGG GAAAACTGTA 1260
TTTAATACAG TTTGTATCTG AATAATCTGT ATGGTTTATA CAGTTTGTGT TGTTCAGAGA 1320
TGTTTAAAGT TTGATCTTTG TTTTTCTAAA GATTAAAAAA GCACTTGCCC CACTGTAAAT 1380
ATACAGCATG TAAAATTTCT RTAGTATATA AATGGCAGCA AATCACAAAA AAAAAAAAAN 1440

(2) INFORMATION FOR SEQ ID NO: 82:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1381 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 82:

CCCGGGCTGC AGGAATTCGK YACGAGGCCA GCAGTTGCTC CCAGTTCAGG AGGTGCTCCT 60
GTACCCTGGC CACAGCCCAA TCCTGCCACT GCTGACATCT GGGGAGACTT TACCAAATCT 120
ACAGGATCAA CTTCCAGCCA GACCCAGCCA GGCACAGGCT GGGTCCAGTT CTGACCTGAG 180
CACGGTTTTT CCTCATGTGA CTTCTGGGAA GGCGCTCCCT CATCTGGGCC AAAGGAAGGA 240
GGACGAAGCC CTCCTCAGCT GGCCTGTGTT TGGGGCATGA ATCTCTCCTC TCCTCCTTGT 300
CTGGCTCTGT TGACAAACCG GGCATGTTTG GCAGTAAATT GGCACCGTGT CACACTGTTT 360
CCTGGGATTC AAGTATGCAA CCAGAACACA GGAGAAGAAA AGCTCCAGGA TCCCTGTCCC 420
CATCTGTCCT CTTGATGTGA GAGAGACTCT GAGACTTCTT CCATCGCAAT GACCTGTATT 480

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AAACACAAGC CCCCCAAGCA AAAGAAGAGG TTGAGTTTGC TGCCAGGATT CAGATCAGCC     540
CTTCCCAGGG TCTGCAGGTG TCACATGATC ACAGTTCAGC GGGAGGCTTT CCGTACCCAC     600
ACTGGCTGTA GCACTTCAGT CCATCTGCCC TCCAGAGGAG GGTTTCTTCC TGATTTTTAG     660
CAGGTTTAGA GGCTGCAGCT TGAGCTACAA TCAGGAGGGA AATTGGAAGG ATTAGCAGCT     720
TTTAAAAATG TTTAAATATT TTGCTTTGCT AATGTGCTGA TCCGCACTAA CTCATCTTTG     780
CAAAAGGAAC TGCTCCCTCG GCGTGCCCCA GCTGGGGCCT CTGAAGGGAT TCCTCACTGT     840
GGGCAGCTGC CCTGAGCTTC AGGCAGCAGT GTTCATCTCT GGCCAGTTGT CTGGTTTCCA     900
TGTATTCTAG GCCAGGTAGG CAACACAGAG CCAAGGCGGG TGCTGGAAGC CAGACGGAAC     960
AGTGTTGGGG CAGGAAGGTG GATGCTGTTG TCATGGAGCT GTGGGAGTTG GCACTCTGTC    1020
TGCTGGTGGC CCTCTCGGCT CACATGTTCA CAGTGCAGCT CCTGGCAGAC TTGGGTTTTC    1080
TCTTTGGTGG TTTCTAAAGT GCCTTATCTG CAAACAACTT CTTTTCTGCT TCAGGAACTG    1140
TGAATGGCTA GAAGAAGGAG CTCAGTAAAC TAGAAGTCCA GGGTTGCTTG GTTTACTGGT    1200
TTATAAGAAA TCTGAAAGCA CCTCTGACAT TCCTTTTATT AACTCACCTC TCAGTTGAAA    1260
GATTTCTTCT TTGAAAGGTC AAGACCGTGA ACTGAAAAAA GTGTTGGCCT TTTTGCGGGA    1320
CCAGATTTTT AAGATAAAAT AAATATTTTT ACTTCTGTCA AAAAAAAAAA AAAAAAATNT    1380
C                                                                    1381
```

(2) INFORMATION FOR SEQ ID NO: 83:

(i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 1706 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 83:

```
ACTGCACCAC TGCCCAGGTC TCCCGGCTGG ATGAAGACGT GGTCCATGAG GAAGCTGGCT      60
AGCTCAGACT GGAGAGTAGC TTCAGGAAAA AAGACAAGTG GCCTAAGGAA ATCACGGCCC     120
CCAACTATCA TCTGAGGGCT AAAGATGAGA AGTAGATCAC TTAATAAGAC AAAAGCCTGT     180
AGGGGGAAAA GAAAGGATGT TTAAAAGGAC AGAATGTTTC CCAAGGTAGA AATGACACTG     240
TCAATTTCTC CTTGGAATGG GGGCAGGGAT ACTCGCCTTG TTGCTCCCAC TTGAGTCAGT     300
ACTCACCTGC TCCTGGATCT CAGTATCCAC ATCTGAGAGG CAACTCTGGC AGAGTTCACA     360
GAAGGCCACC ATTCTGTCCC TCAAACTCGA CAGCTGCTTC TGTGGGCACA GTGGCTTGAA     420
GGGGAAGAAT GAAGACACAG ACTCCTCTGT TCCCATTATC CCATCTAAGA CCCACACTCA     480
```

CCTGGGGAAG CATCTGATTT AGAAATGTGG GTTAGTGTCC AGAGAATGGA AAAATAGACA 540

AGAGTCAAGG CTGGCAGGAT AACCTGTAAC AACAAAGGGT TTGAAAAATG AGGTTTGGGT 600

TAGGAGAGGG AGAGACAGAT AGCCAGAAAC ACACCAGTGA AGAGGAGAGA AAATGAGTAA 660

AGGGAGAGCT AATTCCTTTT CCAGTGGAAA ATGAGTGATA TTCTGGACAT TCTTCAGAGG 720

CATCTACACG AAGTAGAAAT GTCACCGCTC CCTAATTTAC TCTACGTCTT CTAGAATCCC 780

TCAATATTAT CCTTGGCTTC CAGGAAATCC AAGAAGACCC TGGAAGTAGA GTCCACCTTC 840

TAAGAGAGGA ATGTAAGAGG TGACCCCCAC CCACCTGATC TTCCTCGCTT TGTCCACTCC 900

ACGCACTGAG ACTTGACACA CCTAGTGGCC ACCTAGAACG TAGGTCCTTA AAATYTAGCC 960

CGCCAGCCCC CAACCCATCT CTAGCCTGTC CACTCACCTG GTGAGGAACY TYTCCTGTGT 1020

CCACAGCYTT CTGCAGGAGT TGGCAACATG GCTCATAGAG CTCCCAGCGA GTCAGGTCAT 1080

GAGTGCTTTG GGGGAGAAAG GGGAATGTTA TACTGGAAAA GAACAGAGGG AACCAACTCC 1140

ACAGACACCA GTAAAAACGG GATGGGGAAG AGGAGGAAAG CCACTCACTT GTAGAAGGCA 1200

GAGAGGCGTT TCAGAGTGGC TGCCAGATTA TATACCTCAT CCTCATCTAG GAAGGACGAC 1260

TGAGAAGGAA AGAAGATCCA CAATAGCATT TCCCCCAGAA CTCATCAGTC CACATCCCCC 1320

GTCTTGCAGC CCCTCCCACC CTTGTTTGGG GTGTCCCATT GTCCAGCCCC AGCTCCTACC 1380

TGTAACAGCT CTTCAAGCTC CTGCTGGAAR CGGTCAGTCA GCAAATCTAC TAGCTGGCTG 1440

CGGGCAAAGT CCGCCCGGCT GAAGAAAGTG AATTCGGGAT TACAGAGCAG GTAAGAGCAT 1500

GCGCCCCAGC CTCAAGCACC GCTGGCTCTG CATGCTTCAC CACCACCTCC TGGAGTTGCT 1560

GCAGGAACAG CTCCAGGTGC TGAGAAGAAA AGGCAGAAGA TGGTGTGCTG TGGGGATGGG 1620

AGGAGGACAC TCTTCTGGCG GGAAGTGGAA CGGGGTTAAA AGCATTAAAC TTCAAGGATA 1680

AGATGCCTAA RAAAAAAAAA AAAAAA 1706

(2) INFORMATION FOR SEQ ID NO: 84:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 573 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 84:

GAATTCGGCA CGAGCTTGGT AGCCTTAGAA CTGCATGAGC TGCTTTACCA CTGGGAAACA 60

CGAGCACAGC CTAGCTTGAT TTTGTATGTG GTATCAGATC TAAGGTGGAT GGAATTCAGG 120

ACTTCCTGTC TACTCTTTGA TTTTGTTTTA TTTTTAGAAA TGTTTTATTT TGTTTTATTC 180

ATTTATTCAT CTTCAGAGAC ATGGTCTGGC TCTGTTGCCC AGGATGGAGT GCATGGTGTG 240

ATCATAGGCC ACTGCAGTGT TGAGCTCCCG GGCTCAGGCG ATCCTCCTGC CTCAGCTYCC 300

TTAGTAGCTG GGACTATAGG CACATGCCCT ACCATGCCTG GCTTTGTCTA CTTTTTGAAT 360

GATGTCYCAA ACTAGAAGGT CTATTAATTT AAAAAATTAA GGATAGCATG CCATAATTAA 420

AAATAATAAC AGTGGGAAAA GGCACCTTCC AATGATTCAG ACATCAACTT GTGATTTAAA 480

AAAACGAAAA ATAAATAATA GGAAAAAAAG GGGAAAAAGT TAAATAAAAA TAAAATTAAA 540

AAAAAAAAAA AAAAACTCGA GGGGGGCCCG GTA 573

(2) INFORMATION FOR SEQ ID NO: 85:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 684 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 85:

CTCTTTGGCT GTGTCTACCT CCTTCATCTG CTGCGCCGAC ATAAGCACCG CCCTGCCCCT 60

AGGCTCCAGC CGTCCCGCAC CAGCCCCCAG GCACCGAGAG CACGAGCATG GGCACCAAGC 120

CAGGCCTCCC AGGCTGCTCT YCACGTCCCT TATGCCACTA TCAACACCAG CTGCYGCCCA 180

GCTACTTTGG ACACAGCTCA CCCCCATGGG GGGCCGTCCT GGTGGGCGTC ACTCCCCACC 240

CACGCTGCAC ACCGGCCCCA GGGCCCTGCC GCCTGGGCCT CCACACCCAT CCCTGCACGT 300

GGCAGCTTTG TCTCTGTTGA GAATGGACTC TACGCTCAGG CAGGGGAGAR GCCTCCTCAC 360

ACTGGTCCCG GCCTCACTCT TTTCCCTGAC CCTCGGGGGC CCAGGGCCAT GGAAGGACCC 420

TTAGGAGTTC GATGAGAGAG ACCATGAGGC CACTGGGCTT TCCCCCTCCC AGGCCTCCTG 480

GGTGTCATCC CCTTACTTTA ATTCTTGGGC CTCCAATAAG TGTCCCATAG GTGTCTGGCC 540

AGGCCCACCT GCTGCGGATG TGGTCTGTGT GCGTGTGTGG GCACAGGTGT GAGTGTGTGA 600

GTGACAGTTA CCCCATTTCA GTCATTTCCT GCTGCAACTA AGTCAGCAAC ACAGTTTCTC 660

TGAAAAAAAA AAAAAAAAAA AAAC 684

(2) INFORMATION FOR SEQ ID NO: 86:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1036 base pairs

(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 86:

```
TGGAGGCAGA TGCACAGGAG AAAGGTTCCC GTCCGCACCC TCTCAGACCT GAGGCTGAGC     60
TTGCAGTGAG GGCTTCTCCT CGGCCCCTCG CCCGCCCCCA GAGCTGCCAT CCCTGCTGTT    120
ACAAGCCAGA GGAGCCCGGA TGTGAGGCCC CAGATCACCT CCAGGGACTT GGGGTTCCCA    180
TCTGAAATCC TTTATTTTTG TACCATGGGG TGGGCCCCGG GCTGAGAAGG AAGAAGCACC    240
CTCTCCCCGG CCTCCTCTGT CTGCACCCGT GGGGCTGTGA CTTACTCCTG CCTCCAGGGG    300
CGGGGCGGGG CCCCCTGGGA CCTCTTAAGG CCCAAGGTGG GCCCCAGGAC CTYTGGGCAG    360
AGTGGAYTGC TCATGGCAGA TGTGTGGCAA TGTCTGGCTG WGTCTTTCCG GCAMCTGCGT    420
YCCCTYTCCC GGGYTCCCCT GCTGCATGGT GGATGTGCTC CTTCCTGGCC CGGTCACATT    480
GCCTCCTTGA GCCTTAGTCC AGGGGGTCAC TYCTCCCACC CCACCTACCT CACAGGGTTG    540
TTGTGAGGGT GCACAGAGGA GCAAAGTCCC TGAAGGCCCT CAGGCAGTAT ATAGGGGCCG    600
CCCACCTTCA GCTGCCCTGG GATGGGAAGG ACCCAGCCCG ACCCCTGGGC ATAACACTGT    660
GTTTGCAAAT GGAGATTCAG GTATTGGGGA TGCAGGTTGT GGGGAGCTGG CCTGGCAGAG    720
TAGGGGTAGT TGGCTTGGCC TTCTCTTTGG TGATCCCACC CCCAGCCATT TGCATTGCTG    780
GCCCAGCGCC TGGCCTGGGG GGCGGGGAGA GGCAGCAGAA GGGGCTGGGC AGGGGCGGTG    840
GAGGACTCAG GAACTGCCCG GGGAGAGTGG GTATGGCGGC TGAGCCAGGG GCCCTCCTGT    900
GTTTGACTTC CCGGGATGGG TCCTTGCTTC TCAGCTGTGT CCGACCCCAC CATGTAATAA    960
AACCCAAAGG AACAGCAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAN   1020
CCCNGGGGGG GNCCCG                                                  1036
```

(2) INFORMATION FOR SEQ ID NO: 87:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 908 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 87:

```
TTAAACAAAT GGAATCATGC AATATGTGAC CTTTTGCGTC TGGCTTATTT TATTTAGCAT     60
AATGTTTTTG AGGTTCATCC AAGCTGTAGC ATGTATCAGC ACCTCATTTC TTTTTCTGGC    120
TGAATATTAT TCCATTATAT GGATTTACCA CAATTCATTT ACCTATTCAT CTTTTGTTTC    180
```

TGCTGTCTGG CTATTGTGAA TAATGCTTCG ATAAACATTC ATATACAAGT TTCTATGTGG 240

CTTTATGTTT TCATTTCTCT TGGCTATCTA CATGGGAGTA GAATTCTAGG TCATAATATA 300

ATTTTATGTT TAACTTCTCA AAGAATTGCC AAAAGGTTTT TCATAGTGGC TGCATCATTT 360

ACATTCCCAC CGGCAATGTA CAAGGATTTC TATTTTTCCA TATCCTTGCA CTTACCAACA 420

CTTCTTTTTK GTWATWATTT TGTTTTTTCA TTATTGCCAC CCTAGTGGAT GTGAAATGGC 480

ATCTTATTGT TTTGATTTGC ATTTCTCTAA TGACAAATGA TATCATACTT TTTTTATGTG 540

CTTACGGATC AAAGGTATTT CCTTGGAGAA ATGTCCCTTC AAGTCCTTTG CCATTTCAAA 600

ATTTGGTTAT TTGTCTTTTA TTATTCAGTT TTAAGAAATT CTGGCCAGGC GCAGTGGCTC 660

ACCTGTAATC MTAGCACTTT GGGAGGCCAA GGCGGGCAGA TCACTTGAGK TCAGGACTTC 720

GAGACCAGCC TGGCCAACAT GGTGAAACCC CATCTTACTA AAAATACAAA AATTAGCTGG 780

GCGTGGTGGC AGGTGCATGT AATCNTATCT ACTCAGGAGG CTGAGGCAGG AGAATCGCTT 840

GAACCCAGGA GGCGGAGGCT GCAGTGAGCC AAGATCACGC CATTGCACTC TAGCCTGGGT 900

GACACAGA 908

(2) INFORMATION FOR SEQ ID NO: 88:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 655 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 88:

TGCACTGGTT CCTTCTCCCC AGCAAATACT GCCTTCTTGT TTTTCTCTGA TGTGGCAGGT 60

GACTACAAAA TCCGCCTTGG TATTCTTCAA ATGCATATAT ATTCCTTTCT TGTCAGCTCC 120

CTCTCTTCCT AGATTAGAAA ACTGCCTCAT TTTCTGCTCA CTGGATGTGC AGTCCCAGCT 180

TGTCTTCCTC TCCTCCCCCC CTGTTGCAGG TGTTCTTTTT TTTTTTCTTC TCTCCCCACT 240

GGGCAGCAAA AGTTGTTCCA CAGTGGAAAW TTAGGCATCC TCAAGTTTCY TCCCAGCTTC 300

TGCTGTGTTT TCTTAGAGTA AATTGCCAAT TTCTGTTTTT ACAGGAAATC CTTTTTTAAA 360

AATGGAATCA GTGTGGTCCC CATCTACTCT GCAAAAATTG CATTTTTCTC TATTTTCAAA 420

TGAGATTTGT TCAAGTTTCA AAACCACGTG AAATAATAAA TGTATAGTAG TTTTCTTTTC 480

CTTGGGCATT GCTWGATATG TGAAATGGGT TTATGAAAAA TAATAAAATC ATAACGCTAT 540

TTGTTTGACT TTCAATTTCA TGGGAATTTT TCTCAGCTAA ACTCTAAATG GTGATTARGC 600

AAAAAAAAAA AAAAAAAACY GRAGGGGGGC CCGGTACCAA TTCGCCCTAT AATGA 655

(2) INFORMATION FOR SEQ ID NO: 89:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1102 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 89:

TTTTTTTTTT ACCATTTAAA ATAAAATGAA AGTGACCTTC TGTTTATAAA AATCTTTGTC 60
TGCATCTCTG CTTATTTCCT TAGAAGAGAT TCCAAGAAGC GGTGAGTGAT TTCACGGCAG 120
CAGAGGGTTG GGACATATTA CGGGCGCGGA TCCCTCTTGG AGTGAGATGA CTCTCCGGAG 180
AGATTTAGTC GTCACCCTCG CGTGTGAGGC TGCGTCACAC CCCAGGGATG TGTCTATCAA 240
GATGGAAGAT CTTTTACACG CTCTTGATTT TGTTTGSCTY TTTTTCTATT ACTAGTGAGA 300
AKGAAACTTT TTATATGATT ATTATCCATC ATAATCCAAC ACAAATTACT GCTTCATGTT 360
CTTTTACTTT CCTGTGAAGG TTTTAGTGCC TTTTAAAAAT TGCTATATAT TAAGCTTGTT 420
AATACTTCCA TGCTGTATTT GTGGSCATCA RTTTCCCCGG GNACAGGCNT GCACATTTTG 480
CCTTCACACG CTGGGTGGTT TTTCATTTTC AMTTCTATTT CTCGTTCTTC TATCGTTTTA 540
TGTTCAGACG GGTTTCTCCG TGTAGAAAGC AGTTTATGAA GATTTACTTT CGACAGTCTT 600
CTCTCTACTT TCTACAGTGA ATTCTCTGAT GTGTCTGGGA GTTTGGGGGT CTGGGTAAGA 660
RTCCTCCTCT CACCCTATTC TCTATTACGA TCCACAGCCT CATGCTTTAT GARATTGGTG 720
GCCGGGARCG GGGGAGATTT GCGGATCCCC CAAGCCAGAC TTTATCCCCC TATCCCTGCC 780
TCTGGATCCC ACGTACAGGC CTGGGAACTC CCTGTGGGTA GGGGCCAATG GTCTCGCACT 840
CTCACCTGTA CCCCAGGGCT GGCACAGGAT GGTCAAGGAG AGAGGCTGCC CAAGCGCATC 900
CYTCTGGTGT CCCCCTGACA CGCCTCCAAA GTGAGCACGT AGGTTTCAAC AGCCCCACGT 960
TGCAGGTCGG AGATGAAGCT CAGGGTGGAG ACCAGTATCT CACAGTTCTC TTTGCATGGC 1020
CGGGTACTTG TTAGTCAACT GATCAAGTGA AAATTCTAGC CCCAGAGGCA GGAGAATCCG 1080
GAACAAAATT AAACCAGCCA GG 1102

(2) INFORMATION FOR SEQ ID NO: 90:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1533 base pairs

(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 90:

```
GGCACGAGCC GNCACGGGCA GCGCCCCATA GCGCCAGGGA CCCCCTGGCA GCGGGAGCCG      60
CGGGTCGAGG TTATGGATCC AGCGGGCGGC CCCCGGGGCG TGCTCCCGCG GCCCTGCCGG     120
TGNCTGGTGC TGCTGAACCC GCGCGGCGGC AAGGGCAAGG CCTTGCAGCT CTTCCGGAGT     180
CACGTGCAGC CCCTTTTGGC TGAGGCTGAA ATCTCCTTCA CGCTGATGCT CACTGAGCGG     240
CGGAACCACG CGCGGGARCT GGTGCGGTCG GAGGAGCTGG GCCGCTGGRA CGCTCTGGTG     300
GTCATGTYTG GAGACGGGCT GATGCACGAG GTGGTGAACG GGCTTCATGG AGCGGCCTGA     360
CTGGGAGACC GCCATCCAGA AGCCCCTGTG TAGCCTCCCA GCAGGCTCTG GCAACGCSCT     420
GGCAGCTTCC TTRAACCATT ATGCTGGCTA TRAGCAGGTC ACCAATGAAG ACCTCCTGAC     480
CAACTGCACG CTATTGCTGT GCCGCCGGCT GCTGTCACCC ATGAACCTGC TGTCTCTGCA     540
CACGGCTTCG GGGCTGCGCC TCTTCTCTGT GCTCAGCCTG GCCTGGGGCT TCATTGCTGA     600
TGTGGACCTA GAGAGTGAGA AGTATCGGCG TCTGGGGGAG ATGCGCTTCA CTCTGGGCAC     660
CTTCCTGCGT CTGGCAGCCC TGCGCACCTA CCGCGGCCGA CTGGCCTACC TCCCTGTAGG     720
AAGAGTGGGT TCCAAGACAC CTGCCTCCCC CGTTGTGGTC CAGCAGGGCC CGGTAGATGC     780
ACACCTTGTG CCACTGGAGG AGCCAGTGCC CTCTCACTGG ACAGTGGTGC CCGACGAGGA     840
CTTTGTGCTA GTCCTGGCAC TGCTGCACTC GCACCTGGGC AGTGAGATGT TTGCTGCACC     900
CATGGGCCGC TGTGCAGCTG GCGTCATGCA TCTGTTCTAC GTGCGGGCGG GAGTGTCTCG     960
TGCCATGCTG CTGCGCCTCT TCCTGGCCAT GGAGAAGGGC AGGCATATGG AGTATGAATG    1020
CCCCTACTTG GTATATGTGC CCGTGGTCGC CTTCCGCTTG GAGCCCAAGG ATGGGAAAGG    1080
TGTGTTTGCA GTGGATGGGG AATTGATGGT TAGCGAGGCC GTGCAGGGCC AGGTGCACCC    1140
AAACTACTTC TGGATGGTCA GCGGTTGCGT GGAGCCCCCG CCCAGCTGGA AGCCCCAGCA    1200
GATGCCACCG CCAGAAGAGC CCTTATGACC CCTGGGCCGC GCTGTGCCTT AGTGTCTACT    1260
TGCAGGACCC TTCCTCCTTC CCTAGGGCTG CAGGGCCTGT CCACAGCTCC TGTGGGGGTG    1320
GAGGAGACTC CTCTGGAGAA GGGTGAGAAG GTGGAGGCTA TGCTTTGGGG GGACAGGCCA    1380
GAATGAAGTC CTGGGTCAGG AGCCCAGCTG GCTGGGCCCA GCTGCCTATG TAAGGCCTTC    1440
TAGTTTGTTC TGAGACCCCC ACCCCACGAA CCAAATCCAA ATAAAGTGAC ATTCCCAAAA    1500
AAAAAAAAAA AAAAAAAAAA ANCCCGNGGG GGG                                1533
```

(2) INFORMATION FOR SEQ ID NO: 91:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 575 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 91:

ATCCTCTGGA ATCTAGGTGG AAGCCACCAA GCCTTCTTCA CACTTGCGTT CTGAGCATCT 60

GCAGACTTAA CCCCATGTGG CAATCACCAA GGCTTATGGC TTGTGTCCTC CAGAACTGTG 120

GCCAGAGCTG TACCTGGGCC CCTTTGAGCT GAGGCTGAAG CCAGAGTCTG AAGCTCAGCA 180

GGGCAGTARG GCCCTGGGCT TGGCCCCTGA AACCATTCTT TTCTCCTAAG CCTCTGGGCC 240

TTTGATGGGA RGGGCTGTCC TCAAGATTTT TGAAATGCCT TTGGAGGGTT TTTGCCTTGT 300

CTTGGATATT GGCTTCCTTT TAGTTATGCT CATCTCTCTA GCAAGTGAAT GTTTCACAAC 360

CTGCTTGGAT TCTTTCTCTA CCACAGARCC AGGCTGCAAA TTTTACAAAC TTTTACACTC 420

TGTTTCCCTT TTAAATATAA ATTTCAATGT TAAGTCACTT CTTTGCTCCC ATATCTGATT 480

TAGGTTGCTG GAAGTAGCCA AGTCACCTCT TGAATGCTTT GCTGCTTAGA AATTTCCTCT 540

ACTAGGTAGC CTGGGTCATC ACACTTAAGT TCAAA 575

(2) INFORMATION FOR SEQ ID NO: 92:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 639 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 92:

TCCTTTCATC TTAAGCACCA CCCGACAGGG CAGGTACTAT TACCATCTCC GTTTGACAGA 60

TNAGGAACCT GGCACAGGAA GCATTTAAGT GGATTCCCCA GGATCGCCCC ACTGTCAGGA 120

GCAGANTCAG AATGGGCCTC AGCATCAGGC TCCCAATCCT GGCTTCTAAC TGCTGCGCTC 180

TGCCCTTCYC TCWCCCCACC TCCCCACTCC AGTGCCTTTG GTCATGCCAC TGCAGCTTTC 240

ACGCCAATAC TGGATTAGCC TCTTAGTGTT CTTGTCCCTG CAGCCATTTC CCCAGGCAGC 300

AATTCCATGT GCCCTCACTG ATGTAGGTGG CTCTTGTGTC ATTTGTCACA TCCTATTGAA 360

TTGTTTATGC ATCTTGTTCA CACTCACAGC ACCCTCCCTC TCACACGTCC TCCTTATAAA 420

AATGTCCCTC AGTGTCTGCT ATGAGCCAGG TGCAGACTTA AGTGACAGGG CTGCTACGGG 480

AAATAAAAAA TTAACAAGGA GCACCTGCCT CTTAATGCAC AGTAACAAAC TATGTTAAGT 540

GTCAGGAAGG AAAGGTTAAG GATGCCAGGA AGGCTTTTAA TAAATAACCT GACTTAGATG 600

GGCAGGTGGT GCTGARGATT AAGAACGTGT TCTTCTCGA 639

(2) INFORMATION FOR SEQ ID NO: 93:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 744 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 93:

GAATTCGGCA CGAGAGTGGC TGGAGTCTGG CTGCAGAGGG AAGACATCAG CAGGGAGGGA 60

GCCAGGGCCT GTCACATCTT TCCTCTGGCC ATTGTCCTGG TCTTTGTAAG CCCAGAATCT 120

CCCCTTCCCT GAAGGGAGGC CAGCACCCCA GGAGGGCAGC AGGTGTGCTG TGAGGGTTGG 180

AGTAGTGTGA GAGGTCAGGG TACACTAGAA TGGCCATGGA CACCATGTGG GGGTGCTCTG 240

GGCTGGGCCA CAGAACAGTG TCCTTCCTGC TGCTCCTCCC CTGCAGCTTC CCCCGACCTT 300

GTNGTTTATT TGGTTTGATA CCAATCAGCA GACCCTGCAA GGTGGAAGCT CCCAGGCTCT 360

CAGTCCCACS ACTCTCATGT GCCAGTCACC CNTACTGTAA CTGCCCAATG AGTACTTCTT 420

GCCCACTGCC AAGATAGAGC CAGTTTACCA AGACAGGGGA ATTGCAGTAG AGAAAGAGTT 480

GAATATACAT AGAGCCAGCT AAATGGGAGA GTGGAGTTTT CTTATTACTT AAATCAGCCT 540

CCCYTAAAAT TCAGAGGTGA GAATTTTTCA AGGACAGTTT GGTGGSCAGG CCTAGGGAAT 600

GGATGCTGCT GATTGGCTAG GGATGCAATC ATAGGGGTGT AGAAAAGTWC CTTGTGCACT 660

GAGTCCACTT TTGGTGAGAG CTACCAAGGA GCTGCTGGTC TGCTGGTCCC GGTAGAGCCA 720

TCTGGTGTCA GGAATGCAAA AGTG 744

(2) INFORMATION FOR SEQ ID NO: 94:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 526 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 94:

GCAGGGGAAT TCGGCACGG AGGGGTTTCA ACAGGGCTCG TGGGGTGAGG TGCARACACA 60

AAGCCCATAA GTGCTGGCCT GTTGGGACAA ATGAGAGAAA TCCCATAGGG TGGTGATGAC 120

AGCGCAYTCA GCCATCYTAY TCCTGGGGAA AATGAAACTT GTGCTCCTAT CAAATGCTCA 180

GTTGTAAAAC TGGAAAAAAA TTTTAGAAGA CATCTTGTCC AGCATCTGTG TTTATGTCTA 240

TAAAATGTAG AAAACTAAAG CACAGAGATG TTAAATGTTT TGTCCAAGGT CCAACAGCTG 300

GTTAGCARGC TTGGTCTGGT GACCTTTCTA CTGAACCACA GTGCCGCTGG GGGAAGTCCT 360

CAGCACAGAT GGCTGCTGCT ATAGCTGGGG TATGGGCAGT ATTAGTAGTT AACCAGTCAA 420

CCCAAGTTCC CATAGTCTAG GTTCTGCTTC AGCTGGAGGT TAGGGAAAAA CACAAGAAAA 480

TCCCTTACCA CTCTACCAGT GCTGGGGGAT GTACTAAGAG ATCCCC 526

(2) INFORMATION FOR SEQ ID NO: 95:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 426 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 95:

GGCACAGGGC AGGAGAGACT TGGTCCATGG GGAGAAGCCT GCAGTATAGA TGGGACCTCC 60

AGGAGCCCAA GTAGCATAGA CCCTGCTGAT CCGGGGCCAT TGAGCCAGAG GATTTGGGCT 120

GAATGTCCCC AGAGACAAAA GGGAAAGGTA GATCCTTTCC CTTAAAGATG AAAGCCATCG 180

CCCGGGCTTG CTTATTGCTC TCTCTCCTGG TCCTTCCACA TGTTGTTTCT GAACATTTGT 240

TCTGGCATCA CAATCCCCGT CATCCTGTCA TCTGGCCCTT CCCACCTTTC CACCTTATCT 300

CTTGCAGTGT CTCCGCGTCG ACCTGGCACC TGGGTGAARG CTTGCTCTTG CTGGTGCCCA 360

TAGCCCCCAG TGTATGGTCT TGAMCTCCCC AGCCATATGG ARACCCACCT CAGGAGGGCC 420

CCTCGA 426

(2) INFORMATION FOR SEQ ID NO: 96:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 844 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 96:

GGCACAGCGG CACGAGATAG GAAGCTTGGC AGGGGCAGCT CCCCCAGTGC GCATTGCCCT 60

GTAACTCGAG CGCCTGGGAG TGGGGAGAGG CTTGGAAATG GAGCAGGGTG GTGGACCTCG 120

TCTTCTCCTG CTCATCCCAG GCCTCCTCCA TAACACCTAC CTAGCACGGC CTGGGGACTT 180

CCCAGCCCAA GGAACAACTG AGAATACTGA GTGCCAGGGT AGCCCTAGCC CCATTTCACA 240

CCTGGGCAAA GTGAGGTCAC TGGATTCAAA CACTCAGATT TAAACCTCCT CTGTGTCTGC 300

AGCACCTGTA TATAACTGCC AGCCTCTGCT GCCCCTCTCC AAAAAGTCTC TGCCCTTGTC 360

TTTGGCACCT GTCTCTGTCC TCCCCATTCT CTGCTCCTCC TTTCTCCAAC TCAGANTCAC 420

CCTGTTAGTT CAGCAAATGT TCATCGAGCT CCATAATGTA GCAGGACAGG NCTGTCTAAC 480

AGATTCTGGN CTTGCAAGGG TGAGACAAGT ACTCTCCATC TTTCTCTCAT CTTCACAGAT 540

GGTCTGCTCA ACAACTTTGC ACTGAATTGT AAATAATTGA TACTGCATAA AACATTGATG 600

TTCTTTAAGG GTAGTCCAGC AAGGTGGCAA GTCTTATAAT GATAACTGCT CAAGGATCTC 660

TCAGTGAAGC ATTTGGGGST GCTAGCTCTG CCTATGGGTG AGGTCAGCTA TCTCACGCCA 720

TCTACTTCCA CNTGCCCCCC CATGCCAGGC TCACCCTGAG CTGAGATGCC TGAGCAGGTG 780

GCAGAAAGGA GCCACCTGGT TTATGCTTCG GGACCACAAA CTCCTCTATC CAGANGACAG 840

TTTT 844

(2) INFORMATION FOR SEQ ID NO: 97:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1985 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 97:

AGCCCTGCTG AAGTACAGGT TCTTCTATCA GTTTCTGTTG GGCAATGAAC GAGCAACAGC 60

AAAGGAGATC AGGGATGAAT ATGTGGAGAC GCTGAGCAAG ATTTACCTGT CTTACTACCG 120

CTCTTACCTG GGGCGGCTCA TGAAGGTGCA GTATGAGGAA GTCGCTGAGA AAGATGATCT 180

AATGGGTGTG GAAGATACAG CAAAGAAAGG ATTCTYCTCA AAGCCATCGC TCCGCAGCAG 240

GAACACCATT TTCACCCTAG GAACCCGCGG CTCTGTCATC TCCCCCACTG AACTTGAGGC 300

CCCCATCCTG GTGCCTCACA CAGCGCAGCG GNAGAGCAGA GGTATCCATT TGAGGCCCTC 360

TTCCGCAGCC AGCACTACGS CCTCCTAGAC AATTCCTGCC GCGAATACCT TTTCATCTGT 420

GAATTTTTTG TTGTGTCTGG CCCAGYTGCA CACGACCTGT TCCATGCTGT CATGGGCCGT 480

ACACTCAGCA TGACCCTGAA ACACCTGGAT TCTTATCTAG CTGACTGCTA CGATGCCATT 540

GCTGTTTTTC TCTGTATCCA CATTGTTCTC CGGTTCCGTA ACATTGCAGC AAAGAGGGAT 600

GTTCCTGCCC TGGACAGGTA CTGGGGAACA GGTGCTTGCC TTGCTATGGC CACGGTTTGA 660
ACTGATCCTG GAGATGAATG TTCAGAGCGT CCGAAGCACT GACCCCCAGC GCCTAGGGGG 720
GTTGGATACT CGGCCCCACT ATATCACACG CCGCTATGCA GAGTTCTCCT CCGCTCTTGT 780
CAGTATCAAC CAGACAATTC CTAATGAACG GACCATGCAA TTGCTGGGAC AGCTGCAGGT 840
GGAGGTGGAG AATTTTGTCC TCCGAGTGGC AGCTGAGTTC TCCTCAAGGA AGGAGCAGCT 900
TGTGTTTCTG ATCAACAACT ATGACATGAT GCTGGGTGTG CTGATGGAGC GGGCTGCAGA 960
TGACAGCAAA GAGGTTGAGA GCTTCCAGCA GCTGCTCAAT GCTCGGACAC AGGAATTCAT 1020
TGAAGAGTTG CTGTCTCCCC CTTTTGGGGG TTTAGTGGCA TTTGTGAAGG AGGCTGAGGC 1080
TTTGATTGAG CGTGGACAGG CTGAGCGACT TCGAGGGGAA GAAGCCCGGG TAACTCAGCT 1140
GATCCGTGGC TTTGGTAGTT CCTGGAAATC ATCAGTGGAA TCTCTGAGTC AGGATGTAAT 1200
GCGGAGTTTC ACCAACTTCA GAAATGGCAC CAGTATCATT CAGGGAGCGC TGACCCAGCT 1260
GATCCAGCTC TATCATCGCT TCCACCGGGT GCTGTCCCAG CCGCAGCTCC GAGCCCTCCC 1320
TGCCCGGGCT GAGCTCATCA ACATTCACCA CCTTATGGTG GAGCTCAAGA AGCATAAGCC 1380
CAACTTCTGA TGTGCCAGAA ACCGCCCTGA GATCTGCCGG TCATCTCCAT GGACTTCTGC 1440
ACCCCATTCC ATACCCTTCT TCACCTGGGG TACCCCTTCC AGTTTTCCCC TTGCTTCCCA 1500
GGCCCTTGAC ATGGCTTACC TGCCTTCACT CCCAGCACCT TGCCCAACAG GATAAGCTGG 1560
ATCCCCTTGG CCTTCTGAAT ATCCCAGTGT CTTCAGGTTT CCCAAGACCA CTTCCCTGTG 1620
GGCTTCCAAA ATGGCCTTTA TCATTTCTCC AGTCTGTCAC CCTCCTTTCC TGCTCCCATA 1680
CACCCAAGGC TTGTTTCTTC CCCTGTAAAA ACCACTGCCT CAATCTCTGG TTCACTCAAC 1740
TAGTCACCAT GTCCTGAGGC ATGAAGCCTC CTCAGCTCTT GGAATTGCTG GCAAGGGGTG 1800
ACTGCCTCTG AGTCATTGTG TTTTTCAAAG TGATTTCTTT TCTGTAGCTT TTTGACCTAA 1860
GATCTCAGCA ATTTGAACAC TAACCTCTCC CCTCCTGGCT CAAGAATTAC TCCGAAGTCA 1920
GTCTGCAGAA AATAAATATT TAGTATGACA TGAAAAAAAA AAAAAAAAAA AAAAAAAAAA 1980
AAAAA 1985

(2) INFORMATION FOR SEQ ID NO: 98:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1416 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 98:

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ATATGAAGGG AAAGAATTTG ATTATGTTTT CTCAATTGAT GTCAATGAAG GTGGACCATC     60
ATATAAATTG CCATATAATA CCAGTGATGA CCCTTGGTTA ACTGCATACA ACTTCTTACA    120
GAAGAATGAT TTGAATCCTA TGTTTCTGGA TCAAGTAGCT AAATTTATTA TTGATAACAC    180
AAAAGGTCAA ATGTTGGGAC TTGGGAATCC CAGCTTTTCA GATCCATTTA CAGGTGGTGG    240
TCGGTATGTT CCGGGCTCTT CGGGATCTTC TAACACACTA CCCACAGCAG ATCCTTTTAC    300
AGGTGCTGGT CGTTATGTAC CAGGTTCTGC AAGTATGGGA ACTACCATGG CCGGAGTTGA    360
TCCATTTACA GGGAATAGTG CCTACCGATC AGCTGCATCT AAAACAATGA ATATTTATTT    420
CCCTAAAAAA GAGGCTGTCA CATTTGACCA AGCAAACCCT ACACAAATAT TAGGTAAACT    480
GAAGGAACTT AATGGAACTG CACCTGAAGA GAAGAAGTTA ACTGAGGATG ACTTGATACT    540
TCTTGAGAAG ATACTGTCTC TAATATGTAA TAGTTCTTCA GAAAAACCCA CAGTCCAGCA    600
ACTTCAGATT TTGTGGAAAG CTATTAACTG TCCTGAAGAT ATTGTCTTTC CTGCACTTGA    660
CATTCTTCGG TTGTCAATTA AACACCCCAG TGTGAATGAG AACTTCTGCA ATGAAAAGGA    720
AGGGGCTCAG TTCAGCAGTC ATCTTATCAA TCTTCTGAAC CCTAAAGGAA AGCCAGCAAA    780
CCAGCTGCTT GCTCTCAGGA CTTTTTGCAA TTGTTTTGTT GGCCAGGCAG GACAAAAACT    840
CATGATGTCC CAGAGGGAAT CACTGATGTC CCATGCAATA GAACTGAAAT CAGGGAGCAA    900
TAAGAACATT CACATTGCTC TGGCTACATT GGCCCTGAAC TATTCTGTTT GTTTTCATAA    960
AGACCATAAC ATTGAAGGGA AAGCCCAATG TTTGTCACTA ATTAGCACAA TCTTGGAAGT   1020
AGTACAAGAC CTAGAAGCCA CTTTTAGACT TCTTGTGGCT CTTGGAACAC TTATCAGTGA   1080
TGATTCAAAT GCTGTACAAT TAGCCAAGTC TTTAGGTGTT GATTCTCAAA TAAAAAAGTA   1140
TTCCTCAGTA TCAGAACCAG CTAAAGTAAG TGAATGCTGT AGATTTATCC TAAATTTGCT   1200
GTAGCAGTGG GGAAGAGGGA CGGATATTTT TAATTGATTA GTGTTTTTTT CCTCACATTT   1260
GACATGACTG ATAACAGATA ATTAAAAAAA GAGAATACGG TGGATTAAGT AAAATTTTAC   1320
ATCTTGTAAA GTGGTGGGGA GGGGAAACAG AAATAAAATT TTTGCACTGC TGAAAAAAAA   1380
AAAAAAAAAA AAAAGGAAAC TCGAGGGGGG GCCCGG                              1416
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(2) INFORMATION FOR SEQ ID NO: 99:

(i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 1935 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 99:

NTCTACCCTA ATCAAGATGG GGACATACTT CGCGACCAGG TTCTTCATGA ACATATCCAG 60
AGATTGTCTA AAGTAGTGAC TGCAAATCAC AGAGCTCTTC AGATACCAGA GGTTTATCTT 120
CGAGAAGCAC CATGGCCATC TGGACAATCA GAAATCAGGA CAATAAGTGC TTATAAAACC 180
CCCCGGGACA AAGTGCAGTG CATCCTGAGA ATGTGCTCTA CGATTATGAA CCTCCTGAGC 240
CTGGCCAATG AGGACTCTGT CCCTGGAGCG GATGACTTTG TTCCTGTGTT GGTGTTTGTG 300
TTGATAAAGG CAAATCCACC CTGTTTGCTG TCTACTGTGC AGTATATCAG TAGCTTTTAT 360
GCTAGCTGTC TGTCTGGAGA GGAGTCCTAT TGGTGGATGC AGTTCACAGC AGCAGTAGAA 420
TTCATTAAAA CCATCGATGA CCGAAAGTGA CCAAGACCAA GGCCCACCAA GGCAGCAGAC 480
TGTTAATCAG ACAAACAGAT CTCTGAGAAG GTGCATCAGC TGCTTTGAAG GCTGAAGATT 540
GTTTTGTATG ATACTGCACA GCATCAGGCA TTTTAAAGCA GATCTTTACT AAACAGGTTA 600
ATGAGCTAAC AAGCAGGTTC TCTCGTCTTT GGGCTCTTTC CTTTCTGAGT TGCATATTCT 660
ATTTTCTTGT CCCCAAGTAG AGACTAGTAC TACAAAAAGG GACCACATTT TTCAAGTATT 720
TCTAAGTATA AAAAACAAAA CAAAAATCTC TTAGGAAATG TCTAGACCTC CATTCTTGGA 780
TTCCCTTTCT TTCCTTTTAT TTTAAAAAAG AACAGTACCC CTCTTTTAAG ATGCTGTCTT 840
ACATTAATGA GCATCTAATG GAAAGAAGGT ATGAGTTGCA CTGAGGATTA GAATAGTGGT 900
GCGTTAGTGG CATTATCTAT AAATACACTC ACCTAAATTG AAAGCTAAGA AGGAAATGTA 960
AATATAATAT ATATTTATAT TTGATGTAAT ATGGACATCT GCAGATTCTA ATAAACAAGG 1020
ACTATTGCTG ATAGTAGGCT GTGACATACT GTCTTGTGAA ATGGTTTCCT TGACAAAATT 1080
TAAGCTGAGC TTAAAAGCAA AAAAACAAAA AGTACACAGA AATATTTATT AAAATGTAAT 1140
ACAGTTTATT GAACTTTCTA GGTATGGAGT TTGATGGACA GGGCTGCCTY TAATGAGTGT 1200
GAAGGTCACT AAGTCACTTA GACATCTCAC CGTGGAAGTT TGTGAGCCTG CATTAGGAGA 1260
TAGACTGATT ACCATACATG ACATAAAAAG GAACAGTGGA TAGCTCATAC TTTATGGTGG 1320
TTCTTCTCCT CCGAAATAAT ATACTGCAGA AATCCCAGAC AGAGCTCCTT ACAAACCTTT 1380
AATTGTAATA TATTTTTGAT GATTATTCAC ATTGAATGCA CAGACCAAGA ATTCAGTGAA 1440
TGTCATTTTT TAAAAAACTA ATTTGTATTG TCTGCTCTAG TGATACAAGT TTTACTAGTG 1500
ATAAACTATT TTAATCAACC ATACTATTCT TATGGAAAAA AATATCTATT TTGGCAGGTT 1560
TCTGTGCCTT TATTTCCCTC TTCTGAAAAA AAGTCTGTGT TTTCATAGTT TGGTTTGCAT 1620
TGTATATCAA TAATTAATCA GGAATGGGTT TTGGTGCCTG AAAAATTGGC CATGGAGGCA 1680
CACCAAAGCT TCAAGCACAA GTCTTGTACA TGGGCCATCA CTGTCTGGTT TCACTTCGTG 1740

TGTTTCCTAA ACACATTTAG CTGCTTTTTT AACAAACTCA GCCCCATACT TGAGTCCCTT 1800

GTTGTTGGGA GCATTTCCAG GCATCTTTTA AGGGAACTGT GACAAACAGC CTCGGGCAGA 1860

TGAACACGGA GGCTCTCTGT TGTCTGTCTC TGAGATCTTT GTGTCTGGGA ATGCCTAAAG 1920

NTTTTGNTTT TTTTT 1935

(2) INFORMATION FOR SEQ ID NO: 100:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 599 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 100:

GAATTCGGCA CGAGCGTCCA CGCAGCCGGC GGCCGGCCAG CACCCAGGGC CCTGCATGCC 60

AGGTCGTTGG AGGTGGCAGC GAGACATGCA CCCGGCCCGG AAGCTCCTCA GCCTCCTCTT 120

CCTCATCCTG ATGGGCACTG AACTCACTCA AGACTCCGCT GCCCCCGACT CCCTGCTGAG 180

AAGTTCAAAG GGCAGCACGA GGGGGTCTTT GGCTGCTATT GTCATCTGGA GGGGGAAGAG 240

TGAGAGCCGG ATAGCCAAGA CCCCAGGCAT TTTCAGAGGT GGCGGGACCT TAGTCCTACC 300

CCCAACACAC ACCCCTGAGT GGCTCATCCT CCCTTTGGGC ATAACGCTGC CCTTGGGGGC 360

TCCAGAAACA GGCGGTGGGG ATTGTGCCGC TGAGACCTGG AAGGGCAGCC AGCGTGCCGG 420

CCAGCTGTGT GCATTGCTGG CTTAATATGC AGGGCTTGGG GGGCTGTGGC CACATGCCCG 480

GCAGGAGGTG AGTGAGGAGC CCTGTGGCGT GCTGGTGTGG GGATCGTGGG CATTTCAAAC 540

GGGCTTGTCG TACCCTGAAC AATGTATCAA TAGAGAAAAA AAAAAAAAAA AAAACTCGA 599

(2) INFORMATION FOR SEQ ID NO: 101:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 734 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 101:

GAATTCGGCA CAGAAAAAAA AGAGAGACTG GGTCTTACTG TGTTGCCCAG ACTTGTCTTG 60

AACTCCTGCC TCAGCCTCTC AAGTACTTGG GATTATAGGC CAAGAAGCCA CCATGCCTAG 120

CTTCTTCCTG TCATTGATCC AGACTAATAC TCTGGGGTCA GCCTCATTTC TTCTCTTTCT 180

CACTTTGCAC ATCCACTTGT CACCAAATCK RGTTCATTCT GCATCCTAAG TAAGTCCTTT 240

GATTCCTCCA GTTGTTCATT AGTAATGTCT CAARTGTAAT TTTTTCTAGT AGTTTTCAGC 300

CTGTCTTTCC KGCCTTCAGT CTTAACTTCT CCAGTACATA KGCCACATTG TTGTCAGCAK 360

GATCAWATTT TATTTAAAAA TACTTTACAW AKGTTTATKG CCAAATATTA GRAAATACAG 420

ATTCATGGAA AGAAAAATCA CTGTCCCAAG GAGGTCACTG GCATGGTGAG GTTAAGGGGT 480

GATTTTAATT TTTAAAAATG TATATTTTTT CCTGTGTAGA GTAGTAACAC CCTTGAAAAC 540

ACAWTCCCTT GTAAAGTCTC TAATTCTGTA CTCCGCATCT AGSTGRTCTC TTCTTTCTCA 600

GATATTTTAC AATTTCATTT ATCACCACCT TTCTCTAGCC TTTACCCGTC TCTTCAATAT 660

TWACATATGC AGAAGTTTCT CCTAACAAAC ACCTGCCTCT GCCTCAGTTC TGCTACCACC 720

CTGTTGCTTT CTTTCCCTTC ACAATCAAAT TTAAGAGTGT CAAAAAAAAA AAAAAAAAAC 780

TCGA 784

(2) INFORMATION FOR SEQ ID NO: 102:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1035 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 102:

AGAGGCCTGG CTGCGTTGCC CTATCTCCGT CTCCGCCACC CACTTAGCGT TTTAGGCATC 60

AATTACCAGC AGTTTCTCCG CCACTATCTG GAAAATTACC CGATTGCTCC CGGCAGAATA 120

CAAGAGCTTG AAGAACGCCG CAGTTGCGTG GAAGCCTGCA GAGCAAGGGA AGCAGCGTTT 180

GATGCCGAAT ATCAGCGAAA TCCTCACAGG GTGGACCTCG ATATTTTAAC CTTTACGATA 240

GCTCTGACTG CCTCTGAAGT TATCAACCCT CTGATAGAAG AACTTGGTTG CGATAAGTTT 300

ATCAATAGAG AATAGTTAGG TGGTGACACT ACTTCAAGAG AACCTCTGCA TTCCAGTCAT 360

ACCAATCCTG CAACTTGATT TTCAGAAGTC AAGAGTATAT CGCGATAAGA CAGTGCACAG 420

GTGGAGGGGA AAAAAAGGGG GAGGGGGAAG CTTATCTTGA AAAAGCATCA CAGAAGTAGA 480

AAAAAATGTC GAAAGCATTA TAACTGTAAC GTTCTTTGAG TTTGTGATTG ATCCACATTT 540

TTCCCCCTGC ATTATGGAAA ATGTCTCTCA GCATTGCTTT ATTACAAAGT AAAGGATGGT 600

TTTATAAAAT TGAGACTGAT GAAACATCAA TACTAGAGCC CATGAGGATG AAAGAAATTA 660

TCAAATAGTG CTGAACAGAA TAAGATGTTA ACGCTGAGTT ATTAGGACTG GAAGGCTATG 720

AAAAGAACTT GAAATTGTCG GAATATGTGC TCTCTTCATG TCATATTCAA TAGAAGTTTC 780

TAGTTTAAGA TTGATTTTGT GTTTTCTTAG GCATTTCAAG TGACAAGCAA AGTAAATGTA 840

TATATTATGT GATAAATCAT GTTTTCAAGA ACGTCAAATT TCTGGACTTT TTTCTTTCAA 900

TTTTTAATTT TTAAAGTTTT TTTGGTATTA AAAAATCYAT TCACAAGCCA AAAAATWTWT 960

WAAATWTWCM GCGAAAAGCC AAAAAAAAAA AAAAMMAGGG GGGGCCGGGC CCCATCCCCC 1020

CAAGGGGGTC CNGNT 1035

(2) INFORMATION FOR SEQ ID NO: 103:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2218 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 103:

AGGTATTAGG CCCTTTTGTG GGAGCCCCAT GTTTTGTTTT TCTGAGTTGG TGGGGAGGGA 60

SGGAGGGGGA GGGCTGAATT GTTTTGCAGA GGAAGATGGC ATCTGTGCTT TAAATTTCTC 120

ATTACTGGGT TAGAAAACAA AGAGGGAKTG CCCTGCACAT TTTCTTTTGT GCTTTTAAAT 180

GTTTCTTAAG TTGGAACAGG TTTCCTCGGG CCTGTTTTGA CTGATTGCTG GAGTGCATTT 240

GATAGTTAAA AATTACTAAT TGGTTTTATT TCCCTTCACA CTCTGCCTCC CCACTTCTCC 300

CCCCGTTACT GAAAAATAAC CATTTTAGTG TCAGGCTAGA AATTGAATTG CTGAGTTTTG 360

TGTATCCTTT AAATTAAAAA CCACAAGTGT TTATTGTAGT GGTTAAACTG TAGCATCTCA 420

GCATCTGGGT GGAAGCTGCC TATATTTCTT CCCAGTTTAA CTGGGGACCA TCTGTGAAAT 480

TAATTTTCCA TCCAGACAGC TGCTGTGAGC AAATGAACAT AAATGCTCGC TGGAAATTTA 540

CTAACCAGTT TTTATATTGA CCTGCAGTGT AAAAAGCACA TTTAATTATA AACAATATAT 600

TCAAAATGGG CAAATTTTAT TTTCAAATGC AGTGTAGAGC TAGATTAAAA GCAACTCTTT 660

GCCACCTACT CTGCCCTTTT GGCAAAGTTA CCTTGAACAA AGAATCTTAA GGGTTTATTA 720

AGAACTCTTT ATTTTCTTCA TACCCTGTTC TCTGCAGTGC TTTCTAACAG CTTCTGGGTG 780

CAGATTTTCT TCGGCATCCT TTTGCACTCA GCTTATTACA GGTAGGTAGT GCTTAAGAAA 840

AGTCATGGAG GACTAAAGCC TAAGTCCTTT TCACTTTTCC TCCATCTGAA GGTAGGTGAG 900

TTCATCCTCT TCATAGTAAT GCTGTTTTAC CAAGACTTTA TAGCAGATGG ACCCAGAAAG 960

AATTTTCTGC TATTGTGTTC ACTACAACAG GATAGGGACA TCAGACAGCC CCAGAAACCC 1020

CTTCCAGATC TGATATGGGA CTATTAATTT TTATGCTGTT AATTGGTATT CATTCACAAT 1080

GCAGTTGAAG GGGGAAGGCT CCACTGCATT CTTTGGCTAA GGCCTGAATG CTTGCTCATC 1140
TGTAAGATCT ATACTCGAGG TTTTGTTTTC CTTTTAAAAT TCTTTAGGGA GAGAGGGATG 1200
GTTTCTGAGG GGTTCTGAAA GTATGATTCA ATGTGCAACA TACAGGTAGG TCTTCAGCAT 1260
AAGCTGAAAT ATATGCATGT AAAAACTTTG ACATCTTTTT TTTTAATTTT CCACTTTCTT 1320
CTTAACTTTA CTTCTCTTTT TGTCCCCCCC CCATCTTACA GAAGTTGAGG CCAAGGGAGA 1380
ATGGTAGGCA CAGAAGAAAC ATGGCAAACT GCTCTGTGCT TTCAAACCAA AGTGTTCCCC 1440
CCAACCCCAA ATTTGTCTAA GCACTGGCCA GTCTGTTGTG GGCATTGTTT TCTACAACCA 1500
AATTCTGGGT TTTTTTCTTC TTTCTTTAAA CATAGAGGTA CCACCACAAG GGATGCCCTA 1560
CTCTCTCGCA GCTCTTGAAA GCATCTGTTT GAGGGAAAGG TCTCTGGGCA AGCAAGTGGT 1620
TATTTGGATT GCTTGCTTCC CTTTTTCCAC CTGGGACATT GYAATCATAA AATAACAGTA 1680
AATTCCAAAC CTCAAAAACT ATTATGGCCT GAGCACAGCT GAAATCTAGC AGAGTTTAAC 1740
TCTTCTGCCT CCATGTCTGT CACTTATAAT TCAGGTTCTG CTGTTGGCTT CAGAACATGA 1800
GCAGAAGAAT CGTTTTATGC TAGTTATTGC ATTCATGGTT GAAACTCAAC TTAGGGAAAG 1860
GGTTCCAATG TATTAAGCAA TGGGCTGCTT CTCCCCAATC CTCCCTAACA ATTCGTTGTG 1920
TGGACTTCTC ATCTAAAAGG TTAGTGGCTT TTGCTTGGGA TCAGTGCTCT CTATTGATGT 1980
TCTTGCTGGT CTCCAGACAC ATTCCTGTTG CATTAAGACT TGAAAGACTT GTAGATGTGT 2040
GATGTTCAGG CACAGGATGC TGAAAGCTAT GTTACTATTC TTAGTTTGTA AATTGTCCTT 2100
TTGATACCAT CATCTTGTTT TCTTTTTGTA GGTATAAATA AAAACACTGT TGACAATAAA 2160
AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAA 2218

(2) INFORMATION FOR SEQ ID NO: 104:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1351 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 104:

CTTCACAGAC TGACAGAATG GTTTTGTTTT GTTTTGTTTT GTTTTGTTTT GTTTTTGAGA 60
TGGACTCTAG CTCTGTCACC CAGGCTGGAG TGCAGTGGTG CGATCTCGGC TCACTGCAAG 120
CTCCGCCTCC CGGGTTCTCA CCATTCTCCT GCCTCAGCCT CCCGAGTAGC TGGGACTACA 180
GGCGCCCACC ACCACGCCCG GCTAATTTTT TGTATTTTTT AGTAGAGACG GGGTTTCACC 240

ATGTTAGCCA GGATGGTCTC GATCTCCTGA CCTCGTGATC CGCCCGCYTC GGCCTCCCAA 300

AGTGCTGGGA TTACAGGCGT GAGCCACCGT GCCTGCCCCA GAATGGTTTT TAAAGCCACA 360

GTTGAGARGC CACCCATTGC CCGGCGCCTG GACAGTGATC ATCTTGTTCA TCTTGTTCAG 420

TCCTTTCTTG TGTGATTGGA ATTATTCATC CCCTTTGAAA GATGAGAAGG TTGAGATGCA 480

AAGAGTCTAC CTTTCCAAGT TCTCACTGCT GGAAAGARCT AGAAGCACAG TTCAAAGTTC 540

TGGNTTCTGG ACTCTGCAGT CCAGGTYTCC CTTYTCCCAC TTGCCTACCC TCAATGCCAC 600

ACTGTTTTTG AAGTGGCCCA TAACTTGAAG GRAAAGTTTA AAGACAGTTC AATTTAATCA 660

TCAGRATGCA TTCTTTTTTT TTTCGGARAC GGAKTTTCAC TCTTGCTGCC CASGCTGGAG 720

TGCAATGGTG CAATGATCTC GGCTCACTGC AACCTATGCC TCCTGGGTTC AAGNGATTAT 780

CCAGCCTCAG CCTCCCGAGT AGCTGGGATT ATGGGCGCCC ACCACCATGC CCAGCTAATT 840

TTTGTATTTT TTTTTTTAGT AGAGATGGGG TTTCGCCAGG TTGGCCAGGC TGKTCTTGTG 900

AAYTCCTGGC YTCAGGTGAT YTGCCCACYT CATCYTCCAA AAGTGCTGGG ATTACAGGCA 960

TGAGCCACTG CGCCTGGCYT CAGAATGCAT TCTTACACAT CTATCCTAGA CATTTATAAG 1020

CACTCTAATG GATAACAATC CAAGAATAAA TGATTGTAAA AGATGATGCC GAAGAGTTGA 1080

TGTCAATCTT TTTTTCCTAA GAAAAAAAGT CCGCGAGTAT TAAATATTTA GATCAATGTT 1140

TATAAAATGA TTACTTTGTA TATCTCATTA TTCCTATTTT GGAATAAAAA CTGACCTTCT 1200

TTAATCATAT ACTTGTCTTT TGTAAATAGC AGCTTTTGTG TCATTCTCCC CACTTTATTA 1260

GTTAATTTAA ATTGGAAAAA ACCCTCAAAC TAATATTCTT GTCTGTTCCA GTCTTATAAA 1320

TAAAACTTAT AATGCATGTA AAAAAAAAAA A 1351

(2) INFORMATION FOR SEQ ID NO: 105:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2066 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 105:

GGCACGAGGC GGCGGAGGGC CACAATCACA GCTCCGGGCA TTGGGGGAAC CCGAGCCGGC 60

TGCGCCGGGG GAATCCGTGC GGGCGCCTTC CGTCCCGGTC CCATCCTCGC CGCGCTCCAG 120

CACCTCTGAA GTTTTGCAGC GCCCAGAAAG GAGGCGAGGA AGGAGGGAGT GTGTGAGAGG 130

AGGGAGCAAA AAGCTCACCC TAAAACATTT ATTTCAAGGA GAAAAGAAAA AGGGGGGGCG 240

CAAAAATGGC TGGGGCAATT ATAGAAAACA TGAGCACCAA GAAGCTGTGC ATTGTTGGTG 300

GGATTCTGCT CGTGTTCCAA ATCATCGCCT TTCTGGTGGG AGGCTTGATT GCTCCAGGGC 360

CCACAACGGC AGTGTCCTAC ATGTCGGTGA AATGTGTGGA TGCCCGTAAG AACCATCACA 420

AGACAAAATG GTTCGTGCCT TGGGGACCCA ATCATTGTGA CAAGATCCGA GACATTGAAG 480

AGGCAATTCC AAGGGAAATT GAAGCCAATG ACATCGTGTT TTCTGTTCAC ATTCCCCTCC 540

CCCACATGGA GATGAGTCCT TGGTTCCAAT TCATGCTGTT TATCCTGCAG CTGGACATTG 600

CCTTCAAGCT AAACAACCAA ATCAGAGAAA ATGCAGAAGT CTCCATGGAC GTTTCCCTGG 660

CTTACCGTGA TGACGCATTT GCTGAGTGGA CTGAAATGGC CCATGAAAGA GTACCACGGA 720

AACTCAAATG CACCTTCACA TCTCCCAAGA CTCCAGAGCA TGAGGGCCGT TACTATGAAT 780

GTGATGTCCT TCCTTTCATG GAAATTGGGT CTGTGGCCCA TAAGTTTTAC CTTTTAAACA 840

TCCGGCTGCC TGTGAATGAG AAGAAGAAAA TCAATGTGGG AATTGGGGAG ATAAAGGATA 900

TCCGGTTGGT GGGGATCCAC CAAAATGGAG GCTTCACCAA GGTGTGGTTT GCCATGAAGA 960

CCTTCCTTAC GCCCAGCATC TTCATCATTA TGGTGTGGTA TTGGAGGAGG ATCACCATGA 1020

TGTCCCGACC CCCAGTGCTT CTGGAAAAAG TCATCTTTGC CCTTGGGATT TCCATGACCT 1080

TTATCAATAT CCCAGTGGAA TGGTTTTCCA TCGGGTTTGA CTGGACCTGG ATGCTGCTGT 1140

TTGGTGACAT CCGACAGGGC ATCTTCTATG CGATGCTTCT GTCCTTCTGG ATCATCTTCT 1200

GTGGCGAGCA CATGATGGAT CAGCACGAGC GGAACCACAT TGCAGGGTAT TGGAAGCAAG 1260

TCGGACCCAT TGCCGTTGGC TCCTTCTGCC TCTTCATATT TGACATGTGT GAGAGAGGGG 1320

TACAACTCAC GAATCCCTTC TACAGTATCT GGACTACAGA CATTGGAACA GAGCTGGCCA 1380

TGGCCTTCAT CATCGTGGCT GGAATCTGCC TCTGCCTCTA CTTCCTGTTT CTATGCTTCA 1440

TGGTATTTCA GGTGTTTCGG AACATCAGTG GGAAGCAGTC CAGCCTGCCA GCTATGAGCA 1500

AAGTCCGGCG GCTACACTAT GAGGGGCTAA TTTTTAGGTT CAAGTTCCTC ATGCTTATCA 1560

CCTTGGCCTG CGCTGCCATG ACTGTCATCT TCTTCATCGT TAGTCAGGTA ACGGAAGGCC 1620

ATTGGAAATG GGGCGGCGTC ACAGTCCAAG TGAACAGTGC CTTTTTCACA GGCATCTATG 1680

GGATGTGGAA TCTGTATGTC TTTGCTCTGA TGTTCTTGTA TGCACCATCC CATAAAAACT 1740

ATGGAGAAGA CCAGTCCAAT GGAATGCAAC TCCCATGTAA ATCGAGGGAA GATTGTGCTT 1800

TGTTTGTTTC GGAACTTTAT CAAGAATTGT TCAGCGCTTC GAAATATTCC TTCATCAATG 1860

ACAACGCAGC TTCTGGTATT TGAGTCAACA AGGCAACACA TGTTTATCAG CTTTGCATTT 1920

GCAGTTGTCA CAGTCACATT GATTGTACTT GTATACGCAC ACAAATACAC TCATTTAGCC 1980

TTTATCTCAA AATGTTAAAT ATAAGGAAAA AAGCGTCAAC AATAAATATT CTTGAGTATA 2040

AAAAAAAAAA AAAAAAAAAA AAAAAA 2066

(2) INFORMATION FOR SEQ ID NO: 106:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1705 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 106:

AATTCGGCAK AGGGCAGCTG TCGGCTGGAA GGAACTGGTC TGCTCACACT TGCTGGCTTG 60
CGCATCAGGA CTGGCTTTAT CTCCTGACTC ACGGTGCAAA GGTGCACTCT GCGAACGTTA 120
AGTCCGTCCC CAGCGCTTGG AATCCTACGG CCCCCACAGC CGGATCCCCT CAGCCTTCCA 180
GGTCCTCAAC TCCCGYGGAC GCTGAACAAT GGCCTCCATG GGGCTACAGG TAATGGGCAT 240
CGCGCTGGCC GTCCTGGGCT GGCTGGCCGT CATGCTGTGC TGCGCGCTGC CCATGTGGCG 300
CGTGACGGCC TTCATCGGCA GCAACATTGT CACCTCGCAG ACCATCTGGG AGGGCCTATG 360
GATGAACTGC GTGGTGCAGA GCACCGGCCA GATGCAGTGC AAGGTGTACG ACTCGCTGCT 420
GGCACTGCCG CAGGACCTGC AGGCGGCCCG CGCCCTCGTC ATCATCAGCA TCATCGTGGC 480
TGCTCTGGGC GTGCTGCTGT CCGTGGTGGG GGGCAAGTGT ACCAACTGCC TGGAGGATGA 540
AAGCGCCAAG GCCAAGACCA TGATCGTGGC GGGCGTGGTG TTCCTGTTGG CCGGCCTTAT 600
GGTGATAGTG CCGGTGTCCT GGACGGCCCA CAACATCATC CAAGACTTCT ACAATCCGCT 660
GGTGGCCTCC GGGCAGAAGC GGGAGATGGG TGCCTCGCTC TACGTCGGCT GGGCCGCCTC 720
CGGNCTGCTG CTCCTTGGCG GGGGGCTGCT TTGCTGCAAC TGTCCACCCC GCACAGACAA 780
GCCTTACTCC GCCAAGTATT CTGCTGCCGG CTCTGCTGCT GCCAGCAACT ACGTGTAAGG 840
TGCCACGGCT CCACTCTGTT CCTCTCTGCT TTGTTCTTCC CTGGACTGAG CTCAGCGCAG 900
GCTGTGACCC CAGGAGGGCC CTGCCACGGG CCACTGGCTG CTGGGGACTG GGGACTGGGC 960
AGAGACTGAG CCAGGCAGGA AGGCAGCAGC CTTCAGCCTC TCTGGCCCAC TCGGACAACT 1020
TCCCAAGGCC GCCTCCTGCT AGCAAGAACA GAGTCCACCC TCCTCTGGAT ATTGGGGAGG 1080
GACGGAAGTG ACAGGGTGTG GTGGTGGAGT GGGGAGCTGG CTTCTGCTGG CCAGGATGGC 1140
TTAACCCTGA CTTTGGGATC TGCCTGCATC GGTGTTGGCC ACTGTCCCCA TTTACATTTT 1200
CCCCACTCTG TCTGCCTGCA TCTCCTCTGT TGCGGGTAGG CCTTGATATC ACCTCTGGGA 1260
CTGTGCCTTG CTCACCGAAA CCCGCGCCCA GGAGTATGGC TGAGGCCTTG CCCACCCACC 1320
TGCCTGGGAA GTGCAGAGTG GATGGACGGG TTTAGAGGGG AGGGGCGAAG GTGCTGTAAA 1380

CAGGTTTGGG CAGTGGTGGG GGAGGGGGCC AGAGAGGCGG CTCAGGTTGC CCAGCTCTGT 1440

GGCCTCAGGA CTCTCTGCCT CACCCGCTTC AGCCCAGGGC CCCTGGAGAC TGATCCCCTC 1500

TGAGTCCTCT GCCCCTTCCA AGGACACTAA TGAGCCTGGG AGGGTGGCAG GGAGGAGCGG 1560

ACAGCTTCAC CCTTGGAAGT CCTGGGGTTT TTCCTCTTCC TTCTTTGTGG TTTCTGTTTT 1620

GTAATTTAAG AAGAGCTATT CATCACTGTA ATTATTATTA TTTTCTACAA TAAATGGGAC 1680

CTGTGCACAG GRAAAAAAAA AAAAG 1705

(2) INFORMATION FOR SEQ ID NO: 107:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1167 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 107:

TGCAGGAATT CGGCAGAGGT TTTCCGCTAG ACTCTGGCAG TTGGTGAGCA TCATGGCAAC 60

CGTTACAGCC ACAACCAAAG TCCCGGAGAT CCGTGATGTA ACAAGGATTG AGCGAATCGG 120

TGCCCACTCC CACATCCGGG GACTGGGGCT GGACGATGCC TTGGAGCCTC GGCAGGCTTC 180

GCAAGGCATG GTGGGTCAGC TGGCGGCACG GCGGGCGGCT GGCGTGGTGC TGGAGATGAT 240

CCGGGAAGGG AAGATTGCCG GTCGGGCAGT CCTTATTGCT GGCCAGCCGG GCACGGGGAA 300

GACGGCCATC GCCATGGGCA TGGCGCAGGC CCTGGGCCCT GACACGCCAT TCACAGCCAT 360

CGCCGGCAGT GAAATCTTCT CCCTGGAGAT GAGCAAGACC GAGGCGCTGA CGCAGGCCTT 420

CCGGCGGTCC ATCGGCGTTC GCATCAAGGA GGAGACGGAG ATCATCGAAG GGGAGGTGGT 480

GGAGATCCAG ATTGATCGAC CAGCAACAGG GACGGGCTCC AAGGTGGGCA AACTGACCCT 540

CAAGACCACA GAGATGGAGA CCATCTACGA CCTGGGCACC AAGATGATTG AKTCCCTGAC 600

CAAGGACAAG GTCCAGGCCG GGGACGTGAT CACCATCGAC AAGGCGACGG GCAAGATCTC 660

CAAGCTGGGC CGCTCCTTCA CACGCGCCCG CGAACTACGA CGCTATGGGC TCCCAGACCA 720

AGTTCGTGCA GTGCCCAGAT GGGGAGCTCC AGAAACGCAA GGAGGTGGTG CACACCGTGT 780

CCCTGCACGA GATCGACGTC ATCAACTCTC GCACCCAGGG CTTCCTGGCG CTCTTCTCAG 840

GTGACACAGG GGAGATCAAG TCAGAAGTCC GTGAGCAGAT CAATGCCAAG GTGGCTGAGT 900

GGCGCGAGGA GGGCAAGGCG GAGATCATCC CTGGAGTGCT GTTCATCGAC GAGGTCCACA 960

TGCTGGACAT CGAGAGCTTC TCCTTCCTCA ACCGGGCCCT GGAGAGTGAC ATGGCGCCTG 1020

TCCAGCAGGT CTATGGGGAT GCCGTGAGGG CTCTGGTAGC TGGTGCCCCG GATTCGCGTG 1080

ATGCCACGGT TGGTGGCCTC GTGCCGAATT CCTGCAGCCC GGGGGATCCA CTAGTTCTAG 1140

AGCGGCCGCC ACCGCGGTGG ANCTCCN 1167

(2) INFORMATION FOR SEQ ID NO: 108:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1907 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 108:

GGCACAGGGG AATCATCGTG TGATGTGTGT GCTGCCTTTG TGAGTGTGTG GAGTCCTGCT 60

CAGGTGTTAG GTACAGTGTG TTTGATCGTG GTGGCTTGAG GGGAACCCTT GTTCAGAGCT 120

GTGACTGCGG CTGCACTCAG AGAAGCTGCC CTTGGCTGCT CGTAGCGCCG GGCCTTCTCT 180

CCTCGTCATC ATCCAGAGCA GCCAGTGTCC GGGAGGCAGA AGGTACCGGG GCAGCTACTG 240

GAGGACTGTG CGGGCCTGCC TGGGCTGCCC CCTCCGCCGT GGGGCCCTGT TGCTGCTGTC 300

CATCTATTTC TACTACTCCC TCCCAAATGC GGTCGGCCCG CCCTTCACTT GGATGCTTGC 360

CCTCCTGGGC CTCTCGCAGG CACTGAACAT CCTCCTGGGC CTCAAGGGCC TGGCCCCAGC 420

TGAGATCTCT GCAGTGTGTG AAAAAGGGAA TTTCAACGTG GCCCATGGGC TGGCATGGTC 480

ATATTACATC GGATATCTGC GGCTGATCCT GCCAGAGCTC CAGGCCCGGA TTCGAACTTA 540

CAATCAGCAT TACAACAACC TGCTACGGGG TGCAGTGAGC CAGCGGCTGT ATATTCTCCT 600

CCCATTGGAC TGTGGGGTGC CTGATAACCT GAGTATGGCT GACCCCAACA TTCGCTTCCT 660

GGATAAACTG CCCCAGCAGA CCGGTGACCG TGCTGGCATC AAGGATCGGG TTTACAGCAA 720

CAGCATCTAT GAGCTTCTGG AGAACGGGCA GCGGGCGGGC ACCTGTGTCC TGGAGTACGC 780

CACCCCCTTG CAGACTTTGT TTGCCATGTC ACAATACAGT CAAGCTGGCT TTAGCGGGGA 840

GGATAGGCTT GAGCAGGCCA AACTCTTCTG CCGGACACTT GAGGACATCC TGGCAGATGC 900

CCCTGAGTCT CAGAACAACT GCCGCCTCAT TGCCTACCAG GAACCTGCAG ATGACAGCAG 960

CTTCTCGCTG TCCCAGGAGG TTCTCCGGCA CCTGCGGCAG GAGGAAAAGG AAGAGGTTAC 1020

TGTGGGCAGC TTGAAGACCT CAGCGGTGCC CAGTACCTCC ACGATGTCCC AAGAGCCTGA 1080

GCTCCTCATC AGTGGAATGG AAAAGCCCCT CCCTCTCCGC ACGGATTTCT CTTGAGACCC 1140

AGGGTCACCA GGCCAGAGCC TCCAGTGGTC TCCAAGCCTC TGGACTGGGG GCTCTCTTCA 1200

GTGGCTGAAT GTCCAGCAGA GCTATTTCCT TCCACAGGGG GCCTTGCAGG GAAGGGTCCA 1260

GGACTTGACA TCTTAAGATG CGTCTTGTCC CCTTGGGCCA GTCATTTCCC CTCTCTGAGC 1320

CTCGGTGTCT TCAACCTGTG AAATGGGATC ATAATCACTG CCTTACCTCC CTCACGGTTG 1380

TTGTGAGGAC TGAGTGTGTG GAAGTTTTTC ATAAACTTTG GATGCTAGTG TACTTAGGGG 1440

GTGTGCCAGG TGTCTTTCAT GGGGCCTTCC AGACCCACTC CCCACCCTTC TCCCCTTCCT 1500

TTGCCCGGGG ACGCCGAACT CTCTCAATGG TATCAACAGG CTCCTTCGCC CTCTGGCTCC 1560

TGGTCATGTT CCATTATTGG GGAGCCCCAG CAGAAGAATG GAGAGGAGGA GGAGGCTGAG 1620

TTTGGGGTAT TGAATCCCCC GGCTCCCACC CTGCAGCATC AAGGTTGCTA TGGACTCTCC 1680

TGCCGGGCAA CTCTTGCGTA ATCATGACTA TCTCTAGGAT TCTGGCACCA CTTCCTTCCC 1740

TGGCCCCTTA AGCCTAGCTG TGTATCGGCA CCCCCACCCC ACTAGAGTAC TCCCTCTCAC 1800

TTGCGGTTTC CTTATACTCC ACCCCTTTCT CAACGGTCCT TTTTTAAAGC ACATCTCAGA 1860

TTAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAGGG CGGCCGC 1907

(2) INFORMATION FOR SEQ ID NO: 109:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 611 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 109:

ATGAATTAAC GCCAAGCTNT NAATAGGGAC TCACTATGGG GGAAAGNTGG GTAACGCCTG 60

CAGGTACCGT TCCGGAATTC CCGGGTCGAC CCACGCGTCC GATGGGGCTT TAGTAAATCA 120

GGCTTGCAGG CTCAAAGCTG CAATCTGCCC ACTCTCAGGT ACTGAGACTT TGTGGGCCTC 180

AGACACCAGG AAGAAAGTTG GGATACAGTC ATTTGAGTTA AAAAGGGAAT GACCCCTCAG 240

AAACCCGCAT TAGCAGTGTT ACTCTTGGAA GTGCCTTTAC TTTTAACGCT CTCTGTTCTG 300

AAAAAGAGGT GTTTGGTTAC GTGTGAGCCA ACATCACGTT TTGTTAGCTG TGATTTACCT 360

TTGTCCGTTT AAAAGACTTC ACGGAGCCAT TCTGTATACA AGGTGTGCTC TTTCCAATGT 420

AGAAGGGGTT ATGGAAAAGG GTGCGATCCT TTGCTGTAAA CTGGAGAGAC CAGTCCCAAA 480

CAGAGGGGAA TTTTAAGCCC TTCTCATCAC CCAATTGGAT GTTTTTGCTT ATAGCAAATT 540

CCTGCAAAAT AAATAAATAA ATATTTGCAA AACTAAAAAA AAAAAAAAAA AAAAAAAAAA 600

GGGGGGNCCN C 611

(2) INFORMATION FOR SEQ ID NO: 110:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2632 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 110:

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TCCCAGCTCT CAGGACAAGG GCCCTGGGCG ATCTTTTAAA AAAGCCGATT GGGTGTCTTT     60
CTAAAANTAC AACCAGTACT TCATCGTCAA GTTTCTGGGA AGGGAGTCCC CTCCAGATTC    120
TCATGGAGTG ACAAATCTTG ACTCTTGCTC CTGGAATTTT TCAGGCCCAA ACTAGCGTTT    180
CTACAATGAT TTATTTGGCA AATTTGTCTT GATTATGGGT GGCTGATGAG GAACGTGCTT    240
TTGTTAGGAA CCGAAACTGG GCGGCGGTGA GGGCGTGTAC GCAATGAGTC CGGAAGAGGG    300
TGAAATGCTT TCGGTAGGCA CTCCACGGCT GTGAAGATGG CGGCGGCTGC GTGGCTTCAG    360
GTGTTGCCTG TCATTCTTCT GCTTCTGGGA GCTCACCCGT CACCACTGTC GTTTTTCAGT    420
GCGGGACCGG CAACCGTAGC TGCTGCCGAC CGGTCCAAAT GGCACATTCC GATACCGTCG    480
GGGAAAAATT ATTTTAGTTT TGGAAAGATC CTCTTCAGAA ATACCACTAT CTTCCTGAAG    540
TTTGATGGAG AACCTTGTGA CCTGTCTTTG AATATAACCT GGTATCTGAA AAGCGCTGAT    600
TGTTACAATG AAATCTATAA CTTCAAGGCA GAAGAAGTAG AGTTGTATTT GGAAAAACTT    660
AAGGAAAAAA GAGGCTTGTC TGGGAAATAT CAAACATCAT CAAAATTGTT CCAGAACTGC    720
AGTGAACTCT TTAAAACACA GACCTTTTCT GGAGATTTTA TGCATCGACT GCCTCTTTTA    780
GGAGAAAAAC AGGAGGCTAA GGAGAATGGA ACAAACCTTA CCTTTATTGG AGACAAAACC    840
GCAATGCATG AACCATTGCA AACTTGGCAA GATGCACCAT ACATTTTTAT TGTACATATT    900
GGCATTTCAT CCTCAAAGGA ATCATCAAAA GAAAATTCAC TGAGTAATCT TTTTACCATG    960
ACTGTTGAAG TGAAGGGTCC CTATGAATAC CTCACACTTG AAGACTATCC CTTGATGATT   1020
TTTTTCATGG TGATGTGTAT TGTATATGTC CTGTTTGGTG TTCTGTGGCT GGCATGGTCT   1080
GCCTGCTACT GGAGAGATCT CCTGAGAATT CAGTTTTGGA TTGGTGCTGT CATCTTCCTG   1140
GGAATGCTTG AGAAAGCTGT CTTCTATGCG GAATTTCAGA ATATCCGATA CAAAGGARAA   1200
TCTGTCCAGG GTGCTTTGAT CCTTGCAGAR CTGCTTTCAG CAGTGAAACG CTCACTGGCT   1260
CGAACCCTGG TCATCATAGT CAGTCTGGGA TATGGCATCG TCAAGCCACG CCTGGAGTCA   1320
CTCTTCATAA GGTTGTAGTA GCAGRAGCCC TCTATCTTTT GTTCTCTGGC ATGGAAGGGG   1380
TCCTCAGAGT TACTGGGGCC CAGACTGATC TTGCTTCCTT GGCCTTTATC CCCTTGGCTT   1440
TCCTAGACAC TGCCTTGTGC TGGTGGATAT TTATTAGCCT GACTCAAACA ATGAAGCTAT   1500
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TAAAACTTCG GAGGAACATT GTAAAACTCT CTTTGTATCG GCATTTCACC AACACGCTTA 1560
TTTTGGCAGT GGCAGCATCC ATTGTGTTTA TCATCTGGAC AACCATGAAG TTCAGAATAG 1620
TGACATGTCA GTCGGACTGG CGGGAGCTGT GGGTAGACGA TGCCATCTGG CGCTTGCTGT 1680
TCTCCATGAT CCTCTTTGTC ATCATGGTTC TCTGGCGACC ATCTGCAAAC AACCAGAGGT 1740
TTGCCTTTTC ACCATTGTCT GAGGAAGAGG AGGAGGATGA ACAAAAGGAG CCTATGCTGA 1800
AAGAAAGCTT TGAAGGAATG AAAATGAGAA GTACCAAACA AGAACCCAAT GGAAATAGTA 1860
AAGTTAACAA AGCACAGGAA GATGATTTGA AGTGGGTAGA AGAGAATGTT CCTTCTTCTG 1920
TGACAGATGT AGCACTTCCA GCCCTTCTGG ATTCAGATGA GGAACGAATG ATCACACACT 1980
TTGAAAGGTC CAAAATGGAG TAAGGAATGG GAAGATTTGC AGTTAAAGAT GGCTACCATC 2040
AGGGAAGAGA TCAGCATCTG TGTCAGTCTT CTGTACGGCT CCATGGGATT AAAGGAAGCA 2100
ATGACATCCT GATCTGTTCC TTGATCTTTG GGCATTGGAG TTGGCGAGAG GTGTCAGAAC 2160
AAAGAGAACA TCTTACTGAA AACAAGTTCA TAAGATGAGA AAAATCTACG AGCTTCTTAT 2220
TTACAACACT GCTGCCCCCT TTCCTCCCAG ACTCTGACAT GGATGTTCAT GCAACTTAAG 2280
TGTGTTGTTC CTGAACTTTC TGTAATGTTT CATTTTTTAA ATCTGACAAA CTAAAAAGTT 2340
TAACGTCTTC TAAAAGATTG TCATCAACAC CATAATATGT AATCTCCAGG AGCAACTGCC 2400
TGTAATTTTT ATTTATTTAG GGAGTTACAT AGGTGATGGG GGAAATTGTT AACTACCTTT 2460
CATTTTTCCTG GGAAGTCAAG GTTACATCTT GCAGAGGTTG TTTTGAGAAA AAAGGGCCCT 2520
TCTGAGTTAA GGAGCCATAG TTCTATCAAT GATCAAAAGA AAAAAAAAAA AACTCGATCG 2580
GCACGAGGGG GGGCCCGGTA CCCAATTCGC CCTATGGGAN TCGAATGAGA CC 2632

(2) INFORMATION FOR SEQ ID NO: 111:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2249 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 111:

GAATTCGGCA CGAGCTCACC GTGCTGCGTG ACACAAGGCC AGCCTGCGCC TACGAGCCCA 60
TGGACTTTKT RATGGCCCTC ATCTACGACA TGGTACTGSW TGTGGTCACC CTGGGGCTGG 120
CCCTCTTCAC TCTGTGCGGC AAGTTCAAGA GGTGGAAGCT GAACGGGGCC TTCCTCCTCA 180
TCACAGCCTT CCTCTCTGTG CTCATCTGGG TGGCCTGGAT GACCATGTAC CTCTTCGGCA 240
ATGTCAAGCT GCAGCAGGGG GATGCCTGGA ACGACCCCAC CTTGGCCATC ACGCTGGCGG 300

CCAGCGCTGG GTCTTCGTCA TCTTCCACGC CATCCCTGAG ATCCACTGCA CCCTTCTGCC 360
AGCCCTGCAG GAGAACACGC CCAACTACTT CGACACGTCG CAGCCCAGGA TGCGGGAGAC 420
GGCCTTCGAG GAGGACGTGC AGCTGCCGCG GGCCTATATG GAGAACAAGG CCTTCTCCAT 480
GGATGAACAC AATGCAGCTC TCCGAACAGC AGGATTTCCC AACGGCAGCT TGGGAAAAAG 540
ACCCAGTGGC AGCTTGGGGA AAAGACCCAG CGCTCCGTTT AGAAGCAACG TGTATCAGCC 600
AACTGAGATG GCCGTCGTGC TCAACGGTGG GACCATCCCA ACTGCTCCGC CAAGTCACAC 660
AGGAAGAMAC CTTTGGTGAA AGACTTTAAG TTCCAGAGAA TCAGAATTTC TCTTACCGAT 720
TTGCCTCCCT GGCTGTGTCT TTCTTGAGGG AGAAATCGGT AACAGTTGCC GAACCAGGCC 780
GCCTCACAGC CAGGAAATTT GGAAATCCTA GCCAAGGGGA TTTCGTGTAA ATGTGAACAC 840
TGACGAACTG AAAAGCTAAC ACCGACTGCC CGCCCCTCCC CTGCCACACA CACAGACACG 900
TAATACCAGA CCAACCTCAA TCCCCGCAAA CTAAAGCAAA GCTAATTGCA AATAGTATTA 960
GGCTCACTGG AAAATGTGGC TGGGAAGACT GTTTCATCCT CTGGGGGTAG AACAGAACCA 1020
AATTCACAGC TGGTGGGCCA GACTGGTGTT GGTTGGAGGT GGGGGGCTCC CACTCTTATC 1080
ACCTCTCCCC AGCAAGTGCT GGACCCCAGG TAGCCTCTTG GAGATGACCG TTGCGTTGAG 1140
GACAAATGGG GACTTTGCCA CCGGCTTTGC CTGGTGGTTT GCACATTTCA GGGGGGTCAG 1200
GAGAGTTAAG GAGGTTGTGG GTGGGATTCC AAGGTGAGGC CCAACTGAAT CGTGGGGTGA 1260
GCTTTATAGC CAGTAGAGGT GGAGGGACCC TGGCATGTGC CAAAGAAGAG GCCCTCTGGG 1320
TGATGAAGTG ACCATCACAT TTGGAAAGTG ATCAACCACT GTTCCTTCTA TGGGGCTCTT 1380
GCTCTAGTGT CTATGGTGAG AACACAGGCC CCGCCCCTTC CCTTGTAGAG CCATAGAAAT 1440
ATTCTGGCTT GGGGCAGCAG TCCCTTCTTC CCTTGATCAT CTCGCCCTGT TCCTACACTT 1500
ACGGGTGTAT CTCCAAATCC TCTCCCAATT TTATTCCCTT ATTCATTTCA AGAGCTCCAA 1560
TGGGGTCTCC AGCTGAAANS CCCTCCGGGA GGCAGGTTGG AAGGCAGGCA CCACGGCAGG 1620
TTTTCCGCGA TGATGTCACC TAGCAGGGCT TCAGGGGTTC CCACTAGGAT GCAGAGATGA 1680
CCTCTCGCTG CCTCACAAGC AGTGACACCT CGGGTCCTTT CCGTTGCTAT GGTGAAAATT 1740
CCTGGATGGA ATGGATCACA TGAGGGTTTC TTGTTGCTTT TGGAGGGTGT GGGGGATATT 1800
TTGTTTTGGT TTTTCTGCAG GTTCCATGAA AACAGCCCTT TTCCAAGCCC ATTGTTTCTG 1860
TCATGGTTTC CATCTGTCCT GAGCAAGTCA TTCCTTTGTT ATTTAGCATT TCGAACATCT 1920
CGGCCATTCA AAGCCCCCAT GTTCTCTGCA CTGTTTGGCC AGCATAACCT CTAGCATCGA 1980
TTCAAAGCAG AGTTTTAACC TGACGGCATG GAATGTATAA ATGAGGGTGG GTCCTTCTGC 2040
AGATACTCTA ATCACTACAT TGCTTTTTCT ATAAAACTAC CCATAAGCCT TTAACCTTTA 2100

AAGAAAAATG AAAAAGGTTA GTGTTTGGGG GCCGGGGGAG GACTGACCGC TTCATAAGCC 2160

AGTACGTCTG AGCTGAGTAT GTTTCAATAA ACTTTTTGAT ATTTCTCAAA AAAAAAAAAA 2220

AAAAANCCCG GGGGGGGGCC CGGACCTGG 2249

(2) INFORMATION FOR SEQ ID NO: 112:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2193 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 112:

GATACTATAA GGCAAGTGAC TCAGGGGTGC GCCGTTAGAC TAGTGGATCC CGGGTGCAGG 60

AATTCGGCAG AGCGCCGCCG GAGCCGAAGT GCTGGCGCCC CCGCGGCCGC TGCCTCCGCG 120

GANCCCAAAA TCATGAAAGT CACTGTGAAG ACCCCGAAGA AAAGGAGGAA TTCGCCGTGC 180

CCGAGAATAG CTCCGTCCAG CAGTTTAAGG AAGAAATCTC TAAACGTTTT AAATCACATA 240

CTGACCAACT TGTGTTGATA TTTGCTGGAA AAATTTTGAA AGATCAAGAT ACCTTGAGTC 300

AGCATGGAAT TCATGATGGA CTTACTGTTC ACCTTGTCAT TAAAACACAA AACAGGCCTC 360

AGGATCATTC AGCTCAGCAA ACAAATACAG CTGGAAGCAA TGTTACTACA TCATCAACTC 420

CTAATAGTAA CTCTACATCT GGTTCTGCTA CTAGCAACCC TTTTGGTTTA GGTGGCCTTG 480

GGGGACTTGC AGGTCTGAGT AGCTTGGGTT TGAATACTAC CAACTTCTCT GAACTACAGA 540

GTCAGATGCA GCGACAACTT TTGTCTAACC CTGAAATGAT GGTCCAGATC ATGGAAAAWC 600

CCYTTGTTCA GAGCATGCTC NTCAAATCCT GACCTGATGN AGACAGTTAA TTATGGCCAA 660

TCCACAAATG CAGCAGTTGA TACAGAGAAA TCCCAGAAAT TAGTCATATG TTGAATAATC 720

CAGATATAAT GAGACAAACG TTGGAACTTG CCCAGGAATC CAGCAATGAT GCAGGAGATG 780

ATGAGGAACC AGGACCGAGC TTTGAGCAAC CTAGAAAGCA TCCCAGGGGG ATATAATGCT 840

TTAAGGCGCA TGTACACAGA TATTCAGGAA CCAATGCTGA GTGCTGCACA AGAGCAGTTT 900

GGTGGTAATC CATTTGCTTC CTTGGTGAGC AATACATCCT CTGGTGAAGG TAGTCAACCT 960

TCCCGTACAG AAAATAGAGA TCCACTACCC AATCCATGGG CTCCACAGAC TTCCCAGAGT 1020

TCATCAGCTT CCAGCGGCAC TGCCAGCACT GTGGGTGGCA CTACTGGTAG TACTGCCAGT 1080

GGCACTTCTG GGCAGAGTAC TACTGCGCCA AATTTGGTGC CTGGAGTAGG AGCTAGTATG 1140

TTCAACACAC CAGGAATGCA GAGTTTGTTG CAACAAATAA CTGAAAACCC ACAACTTATG 1200

CAAAACATGT TGTCTGCCCC CTACATGAGA AGCATGATGC AGTCACTAAG CCAGAATCCT 1260
GACCTTGCTG CACAGATGAT GCTGAATAAT CCCCTATTTG CTGGAAATCC TCAGCTTCAA 1320
GAACAAATGA GACAACAGCT CCCAACTTTC CTCCAACAAA TGCAGAATCC TGATACACTA 1380
TCAGCAATGT CAAACCCTAG AGCAATGCAG GCCTTGTTAC AGATTCAGCA GGGTTTACAG 1440
ACATTAGCAA CGGAAGCCCC GGCCTCATC CCAGGGTTTA CTCCTGGCTT GGGGGCATTA 1500
GGAAGCACTG GAGGCTCTTC GGGAACTAAT GGATCTAACG CCACACCTAG TGAAAACACA 1560
AGTCCCACAG CAGGAACCAC TGAACCTGGA CATCAGCAGT TTATTCAGCA GATGCTGCAG 1620
GCTCTTGCTG GAGTAAATCC TCAGCTACAG AATCCAGAAG TCAGATTTCA GCAACAACTG 1680
GAACAACTCA GTGCAATGGG ATTTTTGAAC CGTGAAGCAA ACTTGCAAGC TCTAATAGCA 1740
ACAGGAGGTG ATATCAATGC AGCTATTGAA AGGTTACTGG GCTCCCAGCC ATCATAGCAG 1800
CATTTCTGTA TCTKGAAAAA ATGTAATTTA TTTTTGATAA CGGCTCTTAA ACTTTAAAAT 1860
ACCTGCTTTA TTTCATTTTG ACTCTTGGAA TTCTGTGCTG TTATAAACAA ACCCAATATG 1920
ATGCATTTTA AGGTGGAGTA CAGTAAGATG TGTGGGTTTT TCTGTATTTT TCTTTTCTGG 1980
AACAGTGGGA ATTAAGGCTA CTGCATGCAT CACTTCTGCA TTTATTGTAA TTTTTTAAAA 2040
ACATCACCTT TTATAGTTGG GTGACCAGAT TTTGTCCTGC ATCTGTCCAG TTTATTTGCT 2100
TTTTAAACAT TAGCCTATGG TAGTAATTTA TGTAGAATAA AAGCATTAAA AAGAAGCAAA 2160
AAAAAAAAAA AAAAATTCCT GCGGCCGCGA ATTCTTCT 2198

(2) INFORMATION FOR SEQ ID NO: 113:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1043 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 113:

CTGAAGTGTA TGTGGTGAGG AAGAAGAGGC TCCTACTGTA GACAGCCTTG TTCTACAGAT 60
CCTCCCAGAA ATCTCTGGGC CAGGTGGAAC CCAGGGTCAG AGAGGGATGG GAGAGAGGTT 120
TAATTTTCCA TGATAAATAA AAATCTATAA AATAATAAAC AAGAGAAAAG AGATTGGAAA 180
CAGCCAGGTT GGAGCAGTGA GTGAGTAAGG AAACCTGGCT GCCCTCTCCA GATTCCCCAG 240
GCTCTCAGAG AAGATCAGCA GAAAGTCTGC AAGACCCTAA GAACCATCAG CCCTCAGCTG 300
CACCTCCTCC CCTCCAAGGA TGACAAAGGC GCTACTCATC TATTTGGTCA GCAGCTTTCT 360
TGCCCTAAAT CAGGCCAGCC TCATCAGTCG CTGTGACTTG GCCCAGGTGC TGCAGCTGGA 420

RGACTTGGAT GGGTTTGAGG GTTACTCCCT GAGTGACTGG CTGTGCCTGG CTTTTGTGGA 480

AAGCAAGTTC AACATATCAA AGATWAATGA AAATGCAGAT GGAAGCTTTG ACTATGGSCT 540

CTTCCAGATC AACAGCCACT ACTGGTGCAA CRATTATAAG AGTTACTCGG AAAACCTTTG 600

CCACGTAGAC TGTCAAGATC TGCTGAATCC CAACCTTCTT GCAGGCATCC ACTGCGCAAA 660

AAGGATTGTG TCCGGAGCAC GGGGGATGAA CAACTGGGTT AGAATGGAAG KTTGCACTGT 720

TCAGGCCGGC CACTCTTCTA CTGGCTGACA GGATGCCGCC TGAGATKAAA CARGGTGCGG 780

GTGCACCGTG GARTCATTCC AAGACTCCTG TCCTCACTCA RGGATTCTTC ATTTCTTCTT 840

CCTACTGCCT CCACTTCATG TTATTTTCTT CCCTTCCCAT TTACAACTAA AACTGACCAG 900

AGCCCCAGGA ATAAATGGTT TTCTTGGCTT CCTCCTTACT CCCATCTGGA CCCAGTCCCC 960

TGGTTCCTGT CTGTTATTTG TAAACTGAGG ACCACAATAA AGAAATCTTT ATATTTATCG 1020

AAAAAAAAAA AAAAAAAACT CGA 1043

(2) INFORMATION FOR SEQ ID NO: 114:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 703 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 114:

GAATTCGGCA CGAGTGCGCG GGCACCACGG CGGTTTTTCG ACGCTGGCGG TGGACGCAGG 60

CAGCATGGAC CACGGTTGCT GGGCGGATGG GGAGCGTCTA TGGTCAGTTG CCTTAGAAGT 120

GGTGAGATGG GAAGCTGCAG TTGGAAGACC CTGGAGGATG CCTGACAACG GGATGTCTGA 180

CACATGATTG GAGCTCTTTT TGAAATGTTT CTTGCCCTTC CTGGAGCAGA GGAGCCATTA 240

TTTATGCAGG TACATCGAAG TCTTTTGACC TCCATACAGT GATTATGCTT GTCATCGCTG 300

GTGGTATCCT GGCGGCCTTG CTCCTGCTGA TAGTTGTCGT GCTCTGTCTT TACTTCAAAA 360

TACACAACGC GCTAAAAGCT GCAAAGGAAC CTGAAGCTGT GGCTGTAAAA AATCACAACC 420

CAGACAAGGT GTGGTGGGCC AAGAACAGCC AGGCCAAAAC CATTGCCACG GAGTCTTGTC 480

CTGCCCTGCA GTGCTGTGAA GGATATAGAA TGTGTGCCAG TTTTGATTCC CTGCCACCTT 540

GCTGTTGCGA CATAAATGAG GGCCTCTGAG TTAGGAAAGG TGGGCACAAA AATCTTCATG 600

AGCAATACTT CTTAGTAGAT TGTTTTGTTA TTCAAATCAA GTTCTAGTGT TTTTATGTGA 660

GATTATATAA TTTACAGTGT TGTTTTATAT ACTTTTGAAT AAA 703

(2) INFORMATION FOR SEQ ID NO: 115:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 3684 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 115:

```
GGCAGAGGGG GCATGAGCAG GAGGAGGATT ACCGCTACGA GGTGCTCACG GCCGAGCAGA      60
TTCTACAACA CATGGTGGNA ATGTATCCGG GAGGTCAACG AGGTCATCCA GAATCCAGCA     120
ACTATCACAA GAATACTCCT TAGCCACTTC AATTGGGATA AAGAGAAGCT AATGGAAAGG     180
TACTTTGATG GAAACCTGGA GAAGCTCTTT GCTGAGTGTC ATGTAATTAA TCCAAGTAAA     240
AAGTCTCGAA CACGCCAGAT GAATACAAGG TCATCAGCAC AGGATATGCC TTGTCAGATC     300
TGCTACTTGA ACTACCCTAA CTCGTATTTC ACTGGCCTTG AATGTGGACA TAAGTTTTGT     360
ATGCAGTGCT GGAGTGAATA TTTAACTACC AAAATAATGG AAGAAGGCAT GGGTCAGACT     420
ATTTCGTGTC CTGCTCATGG TTGTGATATC TTAGTGGATG ACAACACAGT TATGCGCCTG     480
ATCACAGATT CAAAAGTTAA ATTAAAGTAT CAGCATTTAA TAACAAATAG CTTTGTAGAG     540
TGCAATCGAC TGTTAAAGTG GTGTCCTGCC CCAGATTGCC ACCATGTTGT TAAAGTCCAA     600
TATCCTGATG CTAAACCTGT TCGCTGCAAA TGTGGGCGCC AATTTTGCTT TAACTGTGGA     660
GAAAATTGGC ATGATCCTGT TAAATGTAAG TGGTTAAAGA AATGGATTAA AAAGTGTGAT     720
GATGACAGTG AAACCTCCAA TTGGATTGCA GCCAACACAA AGGAATGTCC CAAATGCCAT     780
GTCACAATTG AGAAGGATGG TGGTTGTAAT CACATGGTCT GTCGTAACCA GAATTGTAAA     840
GCAGAGTTTT GCTGGGTGTG TCTTGGCCCA TGGGAACCAC ATGGATCTGC CTGGTACAAC     900
TGTAACCGCT ATAATGAGGA TGATGCAAAG GCAGCAAGAG ATGCACAGGA GCGATCTAGG     960
GCAGCCCTGC AGAGGTACCT GTTCTACTGT AATCGCTATA TGAACCACAT GCAGAGCCTG    1020
CGCTTTGAGC ACAAACTATA TGCTCAGGTG AAACAGAAAA TGGAGGAGAT GCAGCAGCAC    1080
AACATGTCCT GGATTGAGGT GCAGTTCCTG AAGAAGGCAG TTGATGTCCT CTGCCAGTGT    1140
CGTGCCACAC TCATGTACAC TTATGTCTTC GCTTTCTACC TCAAAAAGAA TAACCAGTCC    1200
ATTATCTTTG AGAATAACCA AGCAGATCTA GAGAATGCCA CAGAGGTGCT CTCGGGCTAC    1260
CTTGAACGAG ATATTTCCCA AGATTCTCTG CAGGATATAA AGCAGAAAGT ACAAGACAAG    1320
TACAGATACT GTGAGAGTCG ACGAAGGGTT TTGTTACAGC ATGTGCATGA AGGCTATGAA    1380
AAAGATCTGT GGGAGTACAT TGAGGACTGA GAATGGCCCT GCATAAAATG AACTCTGAAA    1440
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ACTTTACCAT CTAGAGTGCT CATGCAATTA AAACAAAACA AACACAAACA AGGAGGCACT 1500

AAGCCTATTC TGACACCACT GGTCTGTAGT ACCAGAATTG TTTTGTTAAT GGAAAGTTTA 1560

AGTAAATTAT ATTGTAATAA AAAGGTAGAT AAACCATTGT ACAACAGTAT TCTAGGCCGC 1620

CAACAAAAGT GTGACAGACA CACTAAAAGC CCTCCAACTT TAACTTGTAA CGTAGCTTCA 1680

TTCTCAAAGC TGACTCCTTT TTTTTCTTTT TCCTTTTCCT GAGTGTAGTA CAGTTAAAAT 1740

TTCAAACAGC TCCTTGACAC TGCTTTTCAT GTTCAAACCA GCCATTTTGT TGTACTTTGG 1800

TAAAGGACCT CTTCCCCTTC CTCCCCTACA CATACAGATA CACCCACACA CAGACTGACT 1860

CTCTTTCTCT CATACCCCAA GGTCATGAGT GAATGATGCT TAGTTCCTTG TAAAGAAAAT 1920

CTTGGGATGG GGAAAGGGGT AGGCAGCAAG AGGATTCAAC AAACGAAAAA CATAAAAACT 1980

TTGTATATGA CTTTTAAAAC AAGAGGACAA CACAGTATTT TTCAAAATTG TATATAGCGC 2040

ATATGCATGG ACAAAGCAAG CGTGGCACGT GTTTGCATAA TGTTTAATTA CAAAAAAATA 2100

TTTATTCTTT AAAAATCTTC AAGATTATGT CTATTTGCTG TGCATTTTCT TTCAGTTTGC 2160

TTATCTTTCC CGGGTTGGGG TTGGGATAAA GGTGTGTCGG TTTAGCACCT CTGGAAGACC 2220

TATCTAGAGC TCTTTCACTT TCCTGAGGTT ATTTTGCCCY TTCTGGTGTT GGTATGTCTG 2280

TTGCCGGCCA TGGGCTNCAY GCCTTGAATT CCTGCTCTTG ATCAGGGACA AGGGAGGTCA 2340

AGCTCTGACT AATGCCATGA CCTGATTAAG GGGTACAGCA GGGAGTTTTG TTGCTACAGC 2400

TCATGAATTA ACCTGTCCCA ACCTAATCCC CCTCCATGGC ATCATGCCTC TACCCAAGCC 2460

TTTGTGTGCC CATGTTATGC ACACAGCTGT AGGCATTCTT AAGTCCCCTG TCGCATCCAG 2520

TGGAAGCATT TTAAAATTTC TTTTACTTTT TGGTTTTCCC TTAATTGCTG CTTTTCAGAT 2580

TTTAGTTATG GCTCGTCTGC TCACCCCTTC TCTACATTAG GGTGTCAAAG AGAATGTTTT 2640

GCTTTAAATA TAAATAGCCA TTCATTTAGT CTCAGATTGT GAATTTAAAA TGGTGGATAC 2700

CGAAATTGCT TGTGTGTGTT GCTGTGGGTT TGGTTTGAAG GCAAACACCC CTAGAACATG 2760

ATATTCCCAT CTAGTGCATT TAAATAGAAA TCACTGAGTT TGCTGCTTTT TTATTGTCAG 2820

CAGATAGGAG AATTAATAAT GCATTTTAGC TGTGATGTCC ATTTTTATGA AATTCCTACT 2880

AAGAGCTATG TTAAAAGTAA AGGATGGTGG TGGTTGTATT AACTATATAC CTGTTTAGGC 2940

CATTCTGGCT GTGGTATTTT TCAATAGGTC AGCATCTGTA AATCTGTCAG TTTTATACAG 3000

GAGTGCAGAG TGAACTAGGC AACTAGATTA AGAGGTCTAA ATATGAAATA CCAGTTGAGG 3060

CTGAGGACCT CTTCGTCTTC CTTTAAATGT CTTTTGCCTA GGGAGTGTTT ACCATTTGTG 3120

AGGCAGCTTT GTCTGCTCTT ACACTGTACA TCCTATTACT CCATTGGGAA GTAGGTTCAC 3180

TTTCCTCTGG CCTTTTGCCT AAGTTAGGCT TTGCTGAATC AACCCTACTT TTCCTTTTAG 3240

AAAAGGTTGT TACAGGAGAT TTACTGGCAA CTGTTCTTTT CCCATCAAAA ATCAGTGAAT 3300

GTTTGCTGAG TATAAATGCT GCTTCCTTAA ACCACTTGTC GCTTTAGGAT CAACTTTACC 3360

TGTACCTTTT CTCCTTTCCT CCCTTGCCAC CTCAGGTGCA AATCTGAACT CAGTGTCTGC 3420

TTCTTCCATT TTCTCGTCTC TCTCCCCTCT TCCCCCATTA TCCATATGAC ATTATTTTAC 3480

TTCAAATGAC AGCATCAATC TTAAAAAGAT ATACATTAAA ACTAAGGAGT TTTTTTAAAG 3540

AAAGCCTGAA TAAGTTCCTT TCCCTGGTAA CTTTGAAAAG CAGTCAGAGT TGCTATATAG 3600

ATATATGTGG CTCCTTTAAA ATGCTTTGTG TATGTGTGGT GTTTAAAAAA AAAAAAAAAA 3660

TTCGGGGGGG GGCCCGGTNC CCAT 3684

(2) INFORMATION FOR SEQ ID NO: 116:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1965 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 116:

AAGAAAGGGT ATTAAAATTC TAGATCACAT ATGGACCCGG GAAGGTTTTT NACCCTCTGT 60

TAGTGACATC GAGTCTCCCA CTAGACAAAA TAGGTGGAAA AATCTCTCGA GGGCTCACAT 120

TGTTTTGTCA TCTTCAGGAA AAACACCACC AGGCCATACC ACAGCCTGCC CAGTGAGGCG 180

GTCTTTGCCA ACAGCACCGG GATGCTGGTG GTGGCCTTTG GGCTGCTGGT GCTCTACATC 240

CTTCTGGCTT CATCTTGGAA GCGCCCAGAG CCGGGGATCC TGACCGACAG ACAGCCCCTG 300

CTGCATGATG GGGAGTGAAG CAGCAGGAAG GGGCTCCCAA GAGCTCCTGG TGGTGCAGCC 360

TGTGCTCCCC TCAGAAGCTC TGCTCTTCCC AGGGCTCCCG GCTGGTTTCA GCAGGCGACT 420

TTCTTCCAAT GCTGGGCCCA GACTTCTTGC CTGGGTGCTG GCCTGCCCTC TCCGGNCCGC 480

TTGCTGCCTG TCTGCTTTCC TTGGTGGYTT TGCTGGGTGC TGGGCCTGCC CTCTCCGGCC 540

GCTTGCTGCC TGTCTGCTTT CCTTGGTGGC TTTGCTGGGT GCTGGGCCTG CCTTCTCTGG 600

CTGCTTGCTG CCTGTCTGCT TTCCTTGGTG GCTTTGGCTT CTGCACTCCT TGGCGTCASC 660

TCTCAGGTCC TCCATTCACA CGAGGTCCTC CTCGCTCTGG CCGCTCTTGC TGCTCCTGTC 720

TGAAGAWATC AGACTGATTT CCTCTTAAGA CTCCTAGGGA TGTGGTGAAG AGCTGGGACT 780

CAAGTGCAGT CCACGGTGTG AAACATGAGG GARGTGAGGT GTCCGTCCAC TTCCCCCATA 840

AAGGTGTGCA TTTCAGTTAG GCTGCCCCGC CACAGAGCAG GCTTCATCTG CTCTGCCATC 900

CAGCCCCATC TGGATGTGAG GTGGGGTGGA GACATCATGG GGTGATTGCA GAAAGGGGGA 960

GTGGCGGCCC ACGCAGCTTC TGCTGAGGAG CTGACCGCTC TGAGCTGTTC TGTTTCGTAT 1020

TGCTGCTCTG TGTCTGCATG TATTGTGACC GTGCGGCTCC ACCTCTTCCA GCTGCTGCTA 1080

CAGCTGAGGC CTGGATCCCG GCCTTTCCCT GTGACTTACG TGTCTGTCAC CGGCANGCAG 1140

CCCTACAAAT CCTGGTGACC TGCTCTCCCA AGAACAGAGC CTGTCCCCAG ATGTCCCAGT 1200

AGCGATGAGT AACAGAGGTG GCTGTGGACT TCCTCTACTT CTCCTTGCTG GATCAGGGCC 1260

TTCCTGCCTC CCGCTGGGCA GGTCTGGCCT TGCTCTCTTG GCAGGGCCCC AGCCCCTCTG 1320

ACCACTCTGC AGCTCACCAT GCAGCTGATG CCAAAGTTGT GGTGTCCACT GTGCAGCAGC 1380

CCTGGGAGCC ACTGCCACCT TCAGAGGGGT TCCTTGCTGA GACCCACATT GCTTCACCTG 1440

GCCCCACCAT GGCTGCTTGC CTGGCCCAAC CTAGCGTTCT GTGCCATGCT AGAGCTTGAG 1500

CTGTTGCTCT TCTTCAGGGG AGGAAATAGG GTGGAGAGCG GGAAGGGTCT TGCTCCTAAG 1560

TGTTGCTGCT GTGGCTTTTT TGCCTTCTCC AAAGACGCAC TGCCAGGTCC CAAGCTTCAG 1620

ACTGCTGTGC TTAGTAAGCA AGTGAGAAGC CTGGGGTTTG GAGCCCACCT ACTCTCTGGC 1680

AGCATCAGCA TCCTACTCCT GGCAACATCA GGCCAACGTC CACCCCAGCC TCACATTGCC 1740

AGATGTTGGC AGAAGGGCTA ATATTGACCG TCTTGACTGG CTGGAGCCTT CAAAGCCACT 1800

GGGATGTCCT CCAGGCACCT GGGTCCCATG ACCAGCTCCC CGTCTCCATA GGGGTAGGCA 1860

TTTCACTGGT TTATGAAGCT CGAGTTTCAT TAAATATGTT AAGAATCAAA GCTGTCTTTG 1920

TTCAGGCTGC TATAACAAAA ATATAATAGC CTGGGTGGCT TAAAC 1965

(2) INFORMATION FOR SEQ ID NO: 117:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 503 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 117:

AGTGATCCCC TTGCCTCGGC CTCCCAAAAT GCTGGAATTG TAAGCGTGGG CCTCTGCACC 60

CGGCCTGGTC CGCAATTTAA AAACGCACAG CCACCATTCC CTYTCCAGAA AGCACCCAGA 120

TGCCTTTGGG AGAACCAGCC TCCTCCATGG AGGAAAGCTT GGGATCTGCC TTCCCACCTG 180

GGGAGGAGAG GGATCTGTGG AAAATCCTTC TGACGGACTT CCCCTCAGTG CCTGATCCAT 240

ACTCAATAGT AGAAAAAGTA AGAAATATAC AAAGATAGCA GATACACGGA GACAGTTCCC 300

CAAATAGCTG AGCGAWTAGC GCAGAAGCAA TATTGAAGAC CTAATAGCTG AGACATTTCC 360

AGAACTGATA AAGTGCATCC AGCCACAGAT CAAGCAGCCC AGAAAATTCC AGGCAGCATC 420

AACAAATAAA TAGCCCCACA TGCACCCGTG AAAATGCAGA AGACCAAACA AAAAAGTCCG 480

GTCAACAGCC AGAGTTAAAG AGG 503

(2) INFORMATION FOR SEQ ID NO: 118:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1133 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 118:

GGCACAGCTT GGAATGAACC CCTGTGGATA AGGGGGACTA TTAGATAGAA TAAACATCAA 60

TAAATGCTTG ATGAATAAAC GCTAATCCTA CCTTCCCAGC CTGACACCTC CCAGTGGACA 120

CCACACTTCA CTTGAAGCCT TAGAAACCTT TCCCACCCAT GCTTCCAGCC CTGGCTTCAT 180

GTTGCCATTT CTCACCCCCA GAACAGGCCG CCCGCCTGAA GAAACTACAA GAGCAAGAGA 240

AACAACAGAA AGTGGAGTTT CGTAAAAGGA TGGAGAAGGA GGTGTCAGAT TTCATTCAAG 300

ACAGTGGGCA GATCAAGAAA AAGTTTCAGC CAATGAACAA GATCGAGAGG AGCATACTAC 360

ATGATGTGGT GGAAGTGGCT GGCCTGACAT CCTTCTCCTT TGGGGAAGAT GATGACTGTC 420

GCTATGTCAT GATCTTCAAA AAGGAGTTTG CACCCTCAGA TGAAGAGCTA GACTCTTACC 480

GTCGTGGAGA GGAATGGGAC CCCCAGAAGG CTGAGGAGAA GCGGAACNTG AAGGAGCTGG 540

CCCAGAGGCA ANGAGGAGGA GGCAGCCCAG CAGGGGCCTG TGGTGGTGAG CCCTGCCAGC 600

GACTACAAGG ACAAGTACAG CCACCTCATC GGCAAGGGAG CAGCCAAAGA CGCAGCCCAC 660

ATGCTACAGG CCAATAAGAC CTACGGCTGT KTGCCCGTGG CCAATAAGAG GGACACACGC 720

TCCATTGAAG AGGCTATGAA TGAGATCAGA GCCAAGAAGC GTCTGCGGCA GAGTGGGGAA 780

GAGTTGCCGC CAACCTCCTA GGCGCCCCGC CCAGCTCCCT TTGACCCCTG GGGCAGGGCA 840

GGGGGCAGGG AGAGACAAGG CTGCTGCTAT TAGAGCCCAT CCTGGAGCCC CACCTCTGAA 900

CCACCTCCTA CCAGCTGTCC CTCAGGCTGG GGGAAAACAG GTGTTTGATT TGTCACCGTT 960

GGAGCTTGGA TATGTGCCGTG GCATGTGTGT GTGTGTGTGA GAGTGTGAAT GCACAGGTGG 1020

GTATTTAATC TGTATTATTC CCCGTTCTTG GAATTTTCTT CCCATGGGGC TGGGGTACTT 1080

TACATTCAAT AAATACTGTT TAACCCAAAA AAAAAAAAAA AAAAGAAAGA AGN 1133

(2) INFORMATION FOR SEQ ID NO: 119:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1101 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 119:

```
GGGCACAGCT GAAGCTGCAG ACCTCCCCAG GGGATGGCTC CTCTCCCCCA GGAGCCCCGA     60
GGCAGGGGAG GCAGAAAGCC TGGGCTCTGG GGGGTGGCCT GCGGACAGCT GTGCTGTGGG    120
CCGGGGGCTG GGCCTGTCCC ACAGGGNCGT GGAGCTCGTG GTTCTGAGCA GCCAGCTGGG    180
TGGTGTCTGG GGATAGCTGG GAGGCACAGC GGCTGCCATG TGGGACTGGG ACTGGAGTGC    240
TCCCTGGTCT TGGCCTCTGT GGCTCAGCCT TGCTCTGGTC TGCCTGAGTG CAGGGGCCAA    300
GGGGCACAGG GCCAGTGAGG CCGGCCACGC TCGGGCCCTC ACCTGTGAGA TGGGGTCGGA    360
ATTTKACACA GCCTANGGCT TGGTTCTTGG TKGTNGAMCG TGGACTYCTK AGAACGGGAG    420
TGCTGGTCCT GAAAGGCGTG GTTGGAGACC AGCTGCTTTT CTCGCTGTTT TTCTCTTAGG    480
AGATTAAACA AAAACAGAAA GCACAAGACG AACTCAGTAG CAGACCCCAG ACTCTCCCCT    540
TGCCAGACGT GGTTCCAGAC GGGGAGACGC ACCTCGTCCA GAACGGGATT CAGCTGCTCA    600
ACGGGCATGC GCCGGGGGCC GTCCCAAACC TCGCAGGGCT CCAGCAGGCC AACCGGCACC    660
ACGGACTCCT GGGTGGCGCC CTGGCGAACT TGTTTGTGAT AGTTGGGTTT GCAGCCTTTG    720
CTTACACGGT CAAGTACGTG CTGAGGAGCA TCGCGCAGGA GTGAGGCCCA GGCGCCGAGA    780
CCCAAGGCGC CACTGAGGGC ACCGCGCACC AGAGCGTGAC CTCGGCAGGC TGGACACACT    840
GCCCAGCACA GGCAGACCCA CCAGGCTCCT AGGTTTAGCT TTTAAAAACC TGAAAGGGGA    900
AGCAAAAACC AAAATGTGTG ACTGGGCTTT GGAGGAGACT GGAGCCTCAG CCCTGTCCTG    960
GCCACGGGCC GCTGGGGCTG GTGTGGGTGG GCCTTGTGTG CTGGATTTGT AGCTTATCTT   1020
CCGTGTTGTC TTTGGACCTG TTTTAGTAAA CCCGTTTTTC ATTTTAAAAA AAAAAAAAAA   1080
AAACTTTGGG GGGGGGCCCC N                                             1101
```

(2) INFORMATION FOR SEQ ID NO: 120:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 282 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 120:

```
AGCTTCTCTG TCCAGTCTTG AACTCTGGGS TCTCTTGGAA CTTTCCTCAC CCCTCTCAGC     60
CTGAATATTC CTTCCATGGA TTCCACTCAA CCAGACTTTG GATCTGTGCC TACTTAATCA    120
ACCTTATCTT TGCAATATGT TCGGGCCCAC CTTCCACTCC TTGGTTCTTG TTCCTCCTTG    180
GCCTAACTTG TCCCTTCTCC ACTTCACATC CCCGGTGGGA CAGCATTCCT CCTTCCTCCC    240
AACCTCCCTC CGTCTCAAAA AAAAAAAAAA AAAAAAAAAA TT                       282
```

(2) INFORMATION FOR SEQ ID NO: 121:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2635 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 121:

```
TAAGGGGGTG TGTGCTCACC TCCTCCTGAC CCTTAACACT CCTGTCCTGC CCAGACCAAC     60
AGAGAGAGCT GTCCCTGAGA CCCCGGAGAG AAGCAGCTGC CGAAAGCTGC AGCCTTTCCG    120
CACTCTGAGA CCATGATCTT CCTCCTGCCA GGGGAGAGCC ACCCACAGGC CATGTCCAGC    180
CCCACTTCCC TCAGCCCCCA GGGYTTCCTT CTGGCCCCTC TGAGGATTCC CTAGGGCTGC    240
CCCGCAGAGG GGYTTCCCCA AGCTCTGTTT TGAAGCCTGC AATGTGGAAA AGTGAGAAGT    300
CAGAGGGAAC AGGACAGGTG CAGCCGGGCT CTGAGGCCAC ACCTCACACC TCGCTGTTCC    360
CCAACATCCC CTGAGCAGTG TGAGCTCATC TCACCAGATG AGAAGAGGCC CTGTGCATTT    420
YTTTTGTTTG TTTGTTGCTG TTTTCCCCCA CCCATCCAGT TCTCCTCAGC AAAGCAAATT    480
CCTTAACACC TTTGGTGGAG AATTTCTTAC CCAGACTTGG GGCTGTGATG CCCTTCAGTG    540
CGTGGTGAGT GCAGCGTGTG TGCGTGTGCC TGTGTGTGAA CCTGGGGGCC ATCCTGGTGG    600
CCTGGGAGCG TGAGGAGAGG CCCCCTGTGT GCTGGGTGAG TGGTGGGTGT GGGGTCAATG    660
CAGTGAGGCT CTCTGGGTGA GGCTCCCAAC CTGGCAGTCC CCAGCCTCCC AGCATCTGTG    720
AGCGTCTGTT GGACTTTACA GAAGAGCCTC ATCCYGTCTG CCCCTCACTC TGCCCTGGAA    780
TCAACATCTT CCGAGTCCTT CTTGGGGGAA ATAGCAGAGC CCCACTTAAC TCCATAAACT    840
GCTTCCCATT CCGCAGCCCA GTTCTGATTG TTGAGGTGTC GCGTCGTTCC AGGTCCCCCA    900
GTCCCCTCTT TCTCCTGTCC TCTCTCTGTC CTTCACCTCC CCACTCCAGC CCCGGCTCAG    960
TTCAGGGAAA TGCTGTTCCA YATCAGCCCT CTGCTCTCTG AGGCAGCCGC GCCTCTGACT   1020
CGGAGCTACT TGAAACTTCT GCTCTTGCTA GGATTGGAGT CTACCTATCT CTTCCATTTG   1080
```

TCCCAGCTGG AGTTCTGGAA CTTTCCTCCT CGGGGTGGGG GTGGGGGTTG TTAAGGATGC 1140

TGGGGGGCCT GGGGAAGGAA GGAGTTCAGA GGAAGGGTGT CCCCTGTCCT CTTGATGTCA 1200

CCCTCCGCTC CTGGGACACG TGCTCTCTCT GTCTCTGGGT CTTCTGGTTG TGCACGTTTG 1260

TGTGTCCTTG TAAATATGTT TTAGGAAGAA AGCAAAAGGG ACTGAACTAG CCTTTGGTAG 1320

GATTGCAGGG GTCCAGCCTT GCCTGTTTCC GAAGCCCCCA CACTGCTTTT CGCCCCACTG 1380

AGACTGGTCC CCTCAAAAGG TAGACAAAAC AGCAGCTCCC TGTGGAGTTG AAGGGCGGCC 1440

TCAAAGTGGC TTTTTGTTAG ACAAGGTTAA GGTTTCCTCA TGAGCAAGGT TGCAGATCGG 1500

TCCTTCCTCA GCTCCTTGAT TTGTGACCTT GACCAAGGGG CCTGCCACCC AGCCCCTCCA 1560

GTGCCCTCTC CTCGATGCCT CGCTCCTTCC TGCCCCCACT CCCCTGGCTT AGGCAGGTAG 1620

GGGAATTAGG GCCATGCTGG AAGAAGCTTA ACCATGTGTT CAAAGAACGG TTTCTTGCTT 1680

GCTTGGTCCT GGAACTCCCC TTGGCTGCCC CAGGCCTCCT TGGCCCATGG GTGTTGGGGG 1740

AGGTGGATGT CAGATCTGGT AGGTTGCAGC AGAGAAAATA AATGTGCTTT GAGAGACCAC 1800

TCAGAGAGGG TCCAAGGGTG ATGGAGAAGG AAGCATGGCC TGGGAGTTTG GAAGGGARGG 1860

GTGGTGGGTG GCGGCATCTT GACTGCCCCC TGTTGTCCCA CACGTGGGGG GTGGTCACCC 1920

CYCTTCACTC CAGCCCGCCT GCCTTCAGCC TTCCATGAGC TTCACCTGCT TCCAACTTCA 1980

CTTTGGAGGG GGTGGGGTCC GTTGGCATCA ACACGGGGAC CCTCTGTTTC ACCAAAGCCC 2040

GAGCCCTCAG CCCCTGGGGA GAACAAATGG CTGAGCTTTG ATACCTGGGG TCGTCGAGAG 2100

GCTGCGGGCT GGCGGCAGTC CCAGGGGAGA GACACCACAG AAGGAGACCC AGACATCCCG 2160

AGGAAGTTCC CAGCAGAGCA AACTGCTTTC CAGCCTGAAG CCTGCTTAAA CTGTGTGATG 2220

TGCAATAACT GAGCTTAGAG TTAGGAATTG TGTTCAAGTG CTTGGATTTC CGTCTGTAGA 2280

TTTAACTGCT GAAATTGTAT CTCTCAGTAA TTTTAGATGT CTTTTAAAAA ATTGAAAAAC 2340

AAAGTGTTAG ACTGTGTGCG TGTGCGTTGA TGGGCACTCA AGAGTCCCGT GAGTCATCCA 2400

GCCCTGCCTT TCCCCTGCGC CCCCATCCTC TCACGTCCCG CCCYGCTTCC ACTTGGGGAC 2460

CCTGCCTCGT GTCGTCTTTA TCTGCCTATT ACTCAGCCTA AGGAAACAAG TACACTCCAC 2520

ACATGCATAA AGGAAATCAA ATGTTATTTT TAAGAAAATG GAAAATAAAA ACTTTATAAA 2580

CACCAAAAAA AAAAAAAAAA ACCCNGGGGG GGGGCCGGTA ACCCATTTCG CCTAA 2635

(2) INFORMATION FOR SEQ ID NO: 122:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 994 base pairs

(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 122:

```
GAATTCGGCA GAGGTTCGGC GAAGATAGGG AATAAGGAAG CACAGGAGTA GGGGAGAAGG    60
AAGCACAGGA GTAGGGGAGA TATACAGCGG TCAGGATAAG GGGGAAAGGG CGGTGGTTGC   120
SCAAGAGGTG AAACAAGATG TGAGAGACAA GGGGTAGGGA AGAAATGGGG CAGCGGTTAG   180
GTTCAGAAGC GCATAGACCG TGGCGGACGG GCAATGCGAG GGGCACAGAA AGGAACTGAG   240
GGGTGGGCTA TTTTAARGGA GATGGTCCTT CAGCCCTCTT YTTTTCTGCG TAGTTCTCCT   300
CCTCCAGGCC GCGCGCGGAT ATGTCGTCCG GAAACCAGCC CAGTCTAGGC TGGATGATGA   360
CCCACCTCCT TCTACGCTGC TCAAAGACTA CCAGAATGTC CCTGGAATTG AGAAGGTTGA   420
TGATGTCGTG AAAAGACTCT TGTCTTTGGA AATGGCCAAC AAGAAGGAGA TGCTAAAAAT   480
CAAGCAAGAA CAGTTTATGA AGAAGATTGT TGCAAACCCA GAGGACACCA GATCCCTGGA   540
GGCTCGAATT ATTGCCTTGT CTGTCAAGAT CCGCAGTTAT GAAGAACACT TGGAGAAACA   600
TCGAAAGGAC AAAGCCCACA AACGCTATCT GCTAATGAGC ATTGACCAGA GGAAAAAGAT   660
GCTCAAAAAC CTCCGTAACA CCAACTATGA TGTCTTTGAG AAGATATGCT GGGGGCTGGG   720
AATTGAGTAC ACCTTCCCCC CTCTGTATTA CCGAAGAGCC CACCGCCGAT TCGTGACCAA   780
GAAGGCTCTG TGCATTCGGG TTTTCCAGGA GACTCAAAAG CTGAAGAAGC GAAGAAGAGC   840
CTTAAAGCCT GCAGCAGCAG CCCAAAAAGA AGCAAAGCGG AGGAACCCAG ACAGCCCTGC   900
CAAAGCCATA CCAAAGACAC TCAAAGACAG CCAATAAATT CTGTTCAATC ATTTAAAAAA   960
AAAAAAAAAA AAAAAAAAAA AAAAAGGGGA GGGG                               994
```

(2) INFORMATION FOR SEQ ID NO: 123:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1542 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 123:

```
GGCASAGCCA CCTCGGCCCC GGGCTCCGAA GCGGCTCGGG GGCGCCCTTT CGGTCAACAT    60
CGTAGTCCAC CCCCTCCCCA TCCCCAGCCC CCGGGGATTC AGGCTCGCCA GCGCCCAGCC   120
AGGGAGCCGG CCGGGAAGCG CGATGGGGGC CCCAGCCGCC TCGCTCCTGC TCCTGCTCCT   180
GCTGTTCGCC TGCTGCTGGG CGCCCGGCGG GGCCAACCTC TCCCAGGACG ACAGCCAGCC   240
```

CTGGACATCT GATGAAACAG TGGTGGCTGG TGGCACCGTG GTGCTCAAGT GCCAAGTGAA 300

AGATCACGAG GACTCATCCC TGCAATGGTC TTAACCCTGC TCAGCAGACT CTCTACTTTG 360

GGGAGAAGAG AGCCCTTCGA GATAATCGAA TTCAGCTGGT TAMCTCTACG CCCCACGAGC 420

TCAGCATCAG CATCAGCAAT GTGGCCCTGG CAGACGAGGG CGAGTACACC TGCTCAATCT 480

TCACTATGCC TGTGCGAACT GCCAAGTCCC TCGTCACTGT GCTAGGAATT CCACAGAAGC 540

CCATCATCAC TGGTTATAAA TCTTCATTAC GGGAAAAAGA CACAGCCACC CTAAACTGTC 600

AGTCTTCTGG GAGCAAGCCT GCAGCCCGGC TCACCTGGAG AAAGGGTGAC CAAGAACTCC 660

ACGGAGAACC AACCCGCATA CAGGAAGATC CCAATGGTAA AACCTTCACT GTCAGCAGCT 720

CGGTGACATT CCAGGTTACC CGGGAGGATG ATGGGGCGAG CATCGTGTGC TCTGTGAACC 780

ATGAATCTCT AAAGGGAGCT GACAGATCCA CCTCTCAACG CATTGAAGTT TTATACACAC 840

CAACTGCGAT GATTAGGCCA GACCCTCCCC ATCCTCGTGA GGGCCAGAAG CTGTTGCTAC 900

ACTGTGAGGG TCGCGGCAAT CCAGTCCCCC AGCAGTACCT ATGGGAGAAG GAGGGCAGTG 960

TGCCACCCCT GAAGATGACC CAGGAGAGTG CCCTGATCTT CCCTTTCCTC AACAAGAGTG 1020

ACAGTGGCAC CTACGGCTGC ACAGCCACCA GCAACATGGG CAGCTACAAG GCCTACTACA 1080

CCCTCAATGT TAATGACCCC AGTCCGGTGC CCTCCTCCTC CAGCACCTAC CACGCCATCA 1140

TCGGTGGGAT CGTGGCTTTC ATTGTCTTCC TGCTGCTCAT CATGCTCATC TTCCTTGGCC 1200

ACTACTTGAT CCGGCACAAA GGAACCTACC TGACACATGA GGCAAAAGGC TCCGACGATG 1260

CTCCAGACGC GGACACGGCC ATCATCAATG CAGAAGGCGG GCAGTCAGGA GGGGACGACA 1320

AGAAGGAATA TTTCATCTAG AGGCGCCTGC CCACTTCCTG CGCCCCCCAG GGCCCTGTGG 1380

GGACTTGCTG GGGCCGTCAC CAACCCGGAC TTGTACAGAG CAACCGCAGG GGCCGSCCCT 1440

CCCGNTTGTT CCCCAGCCCA CCCACCCCCT TGTTACAGAA TGTYTKGTTT GGGGTGCGGT 1500

TTTGTWATTG GTTTNGGATN GGGGAAGGGA GGGANGGCGG GG 1542

(2) INFORMATION FOR SEQ ID NO: 124:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1390 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 124:

CAAGCTCTAA TACGACTCAC TATAGGGAAA GCTGGTACGC CTGCAGGTAC CGGTCCGGAA 60

```
TTCCCGGGTC GACCCACGCG TCCGGGCCTC AGGGTGGACG CATGGTTCTG CACTGAGGCC     120
CTCGTCATGG TGGCGCCTGT GTGGTACTTG GTAGCGGCGG CTCTGCTAGT CGGCTTTATC     180
CTCTTCCTGA CTCGCAGCCG GGGCCGGGCG GCATCAGCCG GCCAAGAGCC ACTGCACAAT     240
GAGGAGCTGG CAGGAGCAGG CCGGGTGGCC CAGCCTGGGC CCCTGGAGCC TGAGGAGCCG     300
AGAGCTGGAG GCAGGCCTCG GCGCCGGAGG GACCTGGGCA GCCGCCTACA GGCCCAGCGT     360
CGAGCCCAGC GGGTGGCCTG GGCAGAAGCA GATGAGAACG AGGAGGAAGC TGTCATCCTA     420
GCCCAGGAGG AGGAAGGTGT CGAGAAGCCA GCGGAAAYTC ACCTGTCGGG GAAAATTGGA     480
GCTAAGAAAC TGCGGAANNT GGAGGAGAAA CAAGCGCGAA AGGCCCAGCK TGAGGCAGAG     540
GAGGCTGAAC GTGARGWGCG GAAACGACTC GAGTCCCAGC GCGAATGAGT GGAAGAAGGA     600
GGAGGAGCGG CTTCGCCTGG AGGAGGAGCA GAAGGAGGAG GAGGAGAGGA AGGCCCGCGA     660
GGAGCAGGCC CAGCGGGAGC ATGAGGAGTA CCTGAAACTG AAGGAGGCCT TTGTGGTGGA     720
GGAGGAAGGC GTAGGAGAGA CCATGACTGA GGAACAGTCC CAGAGCTTCC TGACAGAGTT     780
CATCAACTAC ATCAAGCAGT CCAAGGTTGT GCTCTTGGAA GACCTGGCTT CCCAGGTGGG     840
CCTACGCACT CAGGACACCA TAAATCGCAT CCAGGACCTG CTGGCTGAGG GGACTATAAC     900
AGGTGTGATT GACGACCGGG GCAAGTTCAT CTACATAACC CCAGAGGAAC TGGCCGCCGT     960
GGCCAACTTC ATCCGACAGC GGGGCCGGGT GTCCATCGCC GAGCTTGCCC AAGCCAGCAA    1020
CTCCCTCATC GCCTGGGGCC GGGAGTCCCC TGCCCAAGCC CCAGCCTGAC CCCAGTCCTT    1080
CCCTCTTGGA CTCAGAGTTG GTGTGGCCTA CCTGGCTATA CATCTTCATC CCTCCCCACC    1140
ATCCTGGGGA AGTGATGGTG TGGCCAGGCA GTTATAGATT AAAGGCCTGT GAGTACTGCT    1200
GAGCTTGGTG TGGCTTGGTG TGGCAGAAGG CCTGGCCTAG GATCCTAGAT AAGCAGGTGA    1260
AATTTAGGCT TCAGAATATA TCCGAGAGGT GGGGAGGGTC CCTTGGAAGC TGGTGAAGTC    1320
CTGTTCTTAT TATGAATCCA TTCATTCAAG AAAATAGCCT GTTGCAAAAA AAAAAAAAAA    1380
AAAAACTCGA                                                            1390
```

(2) INFORMATION FOR SEQ ID NO: 125:

(i) SEQUENCE CHARACTERISTICS:
  (A) LENGTH: 1288 base pairs
  (B) TYPE: nucleic acid
  (C) STRANDEDNESS: double
  (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 125:

```
GGCGCGCGGG TGAAAGGCGC ATTGATGCAG CCTGCGGCGG CCTCGGAGCG CGGCGGAGCA      60
```

GACGCTGACC ACGTTCCTCT CCTCGGTCTC CTCCGCCTCC AGCTCCGCGC TGCCCGGCAG 120
CCGGGAGCCA TGCGACCCCA GGGCCCCGCC GCCTCCCCGC AGCGGCTCCG CGGCCTCCTG 180
CTGCTCCTGC TGCTGCAGCT GCCCGCGCCG TCGAGCGCCT CTGAGATCCC CAAGGGGAAG 240
CAAAAGGCGC ATCCGGCAGA GGGAGGTGGT GGACCTGTAT AATGGAATGT GCTTACAAGG 300
GCCAGCAGGA GTGCCTGGTC GAGACGGGAG CCCTGGGGCC AATGGCATTC CGGGTACACC 360
TGGGATCCCA GGTCGGGATG GATTCAAAGG AGAAAAGGGG GAATGTCTGA GGGAAAGCTT 420
TGAGGAGTCC TGGACACCCA ACTACAAGCA GTGTTCATGG AGTTCATTGA ATTATGGCAT 480
AGATCTTGGG AAAATTGCGG AGTGTACATT TACAAAGATG CGTTCAAATA GTGCTCTAAG 540
AGTTTTGTTC AGTGGCTCAC TTCGGCTAAA ATGCAGAAAT GCATGCTGTC AGCGTTGGTA 600
TTTCACATTC AATGGAGCTG AATGTTCAGG ACCTCTTCCC ATTGAAGCTA TAATTTATTT 660
GGACCAAGGA AGCCCTGAAA TGAATTCAAC AATTAATATT CATCGCACTT CTTCTGTGGA 720
AGGACTTTGT GAAGGAATTG GTGCTGGATT AGTGGATGTT GCTATCTGGG TTGGCACTTG 780
TTCAGATTAC CCAAAAGGAG ATGCTTCTAC TGGATGGAAT TCAGTTTCTC GCATCATTAT 840
TGAAGAACTA CCAAAATAAA TGCTTTAATT TTCATTTGCT ACCTCTTTTT TTATTATGCC 900
TTGGAATGGT TCACTTAAAT GACATTTTAA ATAAGTTTAT GTATACATCT GAATGAAAAG 960
CAAAGCTAAA TATGTTTACA GACCAAAGTG TGATTTCACA TGTTTTTAAA TCTAGCATTA 1020
TTCATTTTGC TTCAATCAAA AGTGGTTTCA ATATTTTTTT TAGTTGGTTA GAATACTTTC 1080
TTCATAGTCA CATTCTCTCA ACCTATAATT TGGGAATATT GTTGTGGTCT TTTGTTTTTT 1140
CTCTTAGTAT AGCATTTTTA AAAAAATATA AAAGCTACCA ATCTTTGTAC AATTTGTAAA 1200
TGTTAAGAAT TTTTTTTATA TCTGTTAAAT AAAAATTATT TCCMACAACC TTAAAAAAAA 1260
AAAAAAAAAA AAAAAAAAAA AAAAANAA 1288

(2) INFORMATION FOR SEQ ID NO: 126:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1517 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 126:

AGTGGCTTAA AGGCATCGTT TTAGGGATTA CTGGGAAGTA TCTTCAAAGT AATACATGAG 60
AAACATTCCT TCCTAAATCC TTTATTATAT TGAATATCGT ATTAATTGGT TTTCAGAGGT 120

TAAATTAACC ATGTATTCCT GCAATAAATG TCACTTGTNT CTTGTATATA ATCTTTTTTA 180
TATATTACCG GATTGATTCA TTAGTATTTT GTTGAGGATT TTTGTGTCTA TATTCATAAG 240
AGATGCTGGT GTGCAGTTTT CTTTTTTTGT GATAATCTGG TTTTTGTATC AGTAATACAG 300
GCCCCATGAA ACGAGTTGGG AAGTGTTCAC CTCTCTTGTA TTTTTTCAAG AGTTTGTGAA 360
GAATTGCTAT TAATTCTTTA AATGTTTGGT AGAATCTACC ATTGAAATCA TGTGTCCTGG 420
GCTTTTTTTT GAGGGAAGTG TTCTGATAAC TAATTCAGTA TCTACTTTTT ATAGCTCTGT 480
TCAGATTTTG CTTCTTCCTG AGTTAGTTTT GGTAATTTGT GTATCTCTAG GARTTTGTCC 540
ATTTCATTTA TCTCATTTGT TGGCATAAAT TAAACTAAAT TTGGCCTGAG CCTACCTGTA 600
TATCTTGAGT CCCTCTGTAA GGAACTGTAG CCTAACTTGT ACATAAACAA ACTGAAATCC 660
TAAATTAGGA ATGTAGTTTT TGTAACAGCT CCTGAGTCTC AGGCAGTCAC AGCAGYCAAG 720
TCTGTCAATT GCAGGCTGCT AACTAAGCAG CCCATGSTCA AATGAGGCAA AAACCTTTGC 780
TTTTAACACA TAGTATAGCT TTGTAATCCT TTTCTTGCAC ACTCGGGTAA TTTCTTCCTT 840
TTTCATTCCC KGWATTTTCC AKGAATATGA RTCTYCCTTT TTTCCCCTCC TGTCAGTCTA 900
GCTAATGGTT TGTCAATTTT GTTGATCTTT TGAARAACAA ACCTTTGGTT CCACTTTCTT 960
GTTGCATATG CTGARTATTC TCATAATTGG AGTGGAAAGC TGATCTTTGA TTACTTATTT 1020
TACTTAGGGC TGAGGAGTTC ATGGACTTCG CAAAACCTCC TTGAATCTAA ATTGCATCTT 1080
CTTTCCTGGT TTCTGGGCTG AAACATGTTT TTTCCCATCT WANAWACCCT TGGTCTTTTC 1140
ATKGGCGATT AAGACTAGAG AAAGTTCTAG ATMCCTTGTC CTTTTATGCT GTCATTTTGT 1200
TTAAAGGCTT TCTATGTAGT AAAACTATCT ATATAGACAA AATAGAGCCT TGAGTTGTGG 1260
TCTTGAATTT GATCAACATG ATTTACCACA TTCTGTACTG GATATTTCTT CACCTGCTGC 1320
TACTGTAAAC CATTTTATTC TTGGATCTTC TGTAGAGTAT ATTATCACAG GTACTTTTTA 1380
CAGGGGTGTC TAATCTTTTG GCTTCCCTGG GCACATTGAA AGAAGAAGAA TTGTCTTGGG 1440
CCACACATCA AATACGCTAA CACTAATAAT AGTTGATGAG CTAAAAAAAA AAAAAAAAAG 1500
GCAAAAAAGN CCCAAAA 1517

(2) INFORMATION FOR SEQ ID NO: 127:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1073 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 127:

```
TGAATCTATT CTTTGAACAT TCTACAACAA GAATTACATT ATACTGTTAT ACCAGAGTAC      60
TTCTGCAGTG TGAAATAGAT TGGTTTGGAA AATGAACCTG GCTTTGCTAT AAATTACATT     120
CACAGGCCTT TTTGCAAATG TGTAACTTGC CTATCAAAGT AGTTTGTAGG GCAAATGCAG     180
AATATATGTC TCCATCTGGT AAAGTACCTT WTAYTCATGT GGGAAATCAA GTAGTATCAG     240
AACTTGGTCC AATAGTCCAA TTTGTTAAAG CCAAGGGCCA TTCTCTTAGT GATGGGCTGG     300
AGGAAGTCCA AAAAGCAGAA ATGAAAGCTT ACATGGAATT AGTCAACAAT ATGCTGTTGA     360
CTGCAGAGCT GTATCTTCAG TGGTGTGATG AAGCTACAGT AGGGRMGATC ACTCATGMTA     420
GGTATGGWTC TCCTTACCCT TGGCCTCTGW WTCATATTTT GGCCTATCAA AAACAGTGGG     480
AAGTCAAACG TAAGNTGAAA GCTATTGGAT GGGGAAAGAA GACTCTGGAC CAGGTCTTAG     540
AGGATGTAGA GCAGTGCTGT CAAGCTCTCT CTCAAAGACT GGGAACACAA CCGTATTTCT     600
TCAATAAGCA GCCTACTGAA CTTGACGCAC TGGTATTTGG CCATCTATAC ACCATTCTTA     660
CCACACAATT GACAAATGAT GAACTTTCTG AGAAGGTGAA AAACTATAGC AACCTCCTTG     720
CTTTCTGTAG GAGAATTGAA CAGCACTATT TTGAAGATCG TGGTAAAGGC AGGCTGTCAT     780
AGAGTTATGT GTTAGTCTCA GGAGTCTTAA CTTTTGAAAT ATGTTTTACT TGAATGTTAC     840
ATTAGATATT GGTGTCAGAA TTTTAAAACC AAATTACTGC TTTTTGAAAC CTCAAATTAT     900
ATAATGTATC TTATGTATGT GCTTTATATT GTTATTTGTG TATACATTAA AATAATTCTG     960
AATTATTTAA TCTGATATGT TGTATTCTGT ATCTTGAAAT TTTTGTTTCC TTGAAACATG    1020
CATGCATTTA AAAATAAAGC TTAAACAACT GTAAAAAAAA AAAAAAAAAA CTC           1073
```

(2) INFORMATION FOR SEQ ID NO: 128:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 300 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 128:

```
CAACCCCTGC CTTTTTTTTG TTTTCCATTT GCTTGGTAGA TCTTCCTCCA TCCCTTTATT      60
TTGAGCCTAT GTGTGTCTCT GCCCGTGAGA TGAGTCTCCT GAATACAGCA CACTTACTGG     120
TCTTGACTCT GTATCCAATT TGCCAGTCTG TGTCTTTCAT TTGGAGCATT TAGCCCATTT     180
ACATTTAAGG TKAATATTGT TATGTGTGAA TTTRATCYTR TCATTATGWT GTTAGCTGGT     240
TATTTTGCTT GTTAGTTGAT GCAGTTTCTT CCNGGCATCA ATGGTCTTTA CAANTTGGCA     300
```

(2) INFORMATION FOR SEQ ID NO: 129:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1275 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 129:

```
GGCAGAGCCT GTCCCTGCTG CCCCTGCAAA AAAAACCCCC TCTGGTGTGA GCAGGATGGT     60
TGGAGGTTAT GTGAGCTCCT TCTCCTTTCC TCCAGTTTCC TCTTCCCTTC TCCTCCCTGC    120
CTCTTTTGCT TTTCCCTTTC TTCCTGGTAC CCCCTGCCCA TTCCTGTATT TTCTCCCATC    180
GCCATTCTCC CCTCTCCCAC TGTCCCTAAC CCGTTCAAAC TCTTTCCTCT TAAATGGTTG    240
AGATTTTCTC TCACCAAGCA CACCCCAGTA TTAATTAAAC TAGCTGCAAA CAGGCAGCAA    300
GTGGTCTACC ATGACAGATG GGTTTTGTGT GTGTGTGTGT GTGTGTAATT GTAATAAAAC    360
ATATTGARTC ACTCAATAAA CACAGAGTGT CTACTACATG TATCARGCAC TATCATAGAT    420
GCTAATTAAC GAAACTGAAA TGGCCAGGCC CTCACAGTGG CTCATGCCTA TAATCCCAGC    480
ACTTTGGGAG GATGAGGCAG GAGGATCACT TGAGGCCGGG AGTTCAAGAC CAGCCTGGGC    540
AACATAGTAA GACTCCATCT CTACAAAAAA AAAATTTTTT TTATTATACT TTAAGTTTTG    600
GGTTACATGT GCAGAACGTG TAGTTTTGTT ACATAGGTAT ATACGTGCCC TGGTAGTTTG    660
CTGCACCCAT CAACCCATCA CCTACATTAG GTATTTCTCC TAATGTTACC CCTCTCCTAG    720
CCCCCCACCC CGTGACAGGC CCTGGTGTGT GATGTTCCCC TCCCTGTGTC CATGTGTTCT    780
CATTGGTCAA CTCTCACCTA TGGAGTGAGA ACATGTGGTA TTTGGTTTTC TGATCTTGTG    840
ATAGCTTGCT GAGAATGTKG GTTTCCAGCT TTATCCACGT CCCTGCAAAG GGCATAAACT    900
CATCCCTTTT TATGGCTGCA TAGTGTTCCA TGGTGTATAC GTGCCACATT TTCTTAATCT    960
ATCATTGATG GACAAGTTTT GCTATTGTGA ATAGTGCCAC AATAAACATA CGTGTGCGTG   1020
TGTCTTTATA GCAGCATGAT TTATAATCCT TTGGGTATAT ACCCAGTAAT GGGATCACTG   1080
AGTCAAATGG TATTTCTCGT TCTAGATCCG TAAGGAATTG CCACACTGTC TTCCACAATG   1140
TTTGAACTAA TNTACACTCC CACCAACAGT GTAAAAGTGT TTCTATTTTT CCACAACCTC   1200
TCCAACATCT GTTATTTCCT GACTTTTTAA TGAACGTCAT TCTAACTGGC GTGAGATGGT   1260
ATCTCATTGT GGTTT                                                    1275
```

(2) INFORMATION FOR SEQ ID NO: 130:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 472 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 130:

```
CNGAAACCCC GTGAACCCTC CCCGGGTTAA AAAGCCCCCC CTAAATGGGG GGAACGCYTC    60
ACACGTTATA AAAAAGCACT AGAATGTTTT GAAAGCGAGA AACAACAGCT GTGTAGGGTA   120
GCTAGCAGTT AGTGTTGTAC AGAAGACAGA TATTTGTGCA TTTYTGCATT TTCTAAGTTT   180
GCTGCAATGA GCATGTATTA CTTTCATAGT TATAAAACAC ATGCAAAATG CCCTTTTAAA   240
ATGAAAAAAA ATCCATGAGT GTAAGTGATA TATATGCTTT GGAAAGCCTG GGACGGTCAT   300
TGTTTACTCT CAATAGTATG TGTTTGCCTT TGTCTTTTTG AGACATTTTG TTTTAATCTG   360
TTGATGACAA TAACCTGTTG ATAATATAAC TTGATAACAA ATAAAATGAC TTATGATTGA   420
AWMAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA NN           472
```

(2) INFORMATION FOR SEQ ID NO: 131:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1950 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 131:

```
ACCTCTCAGA ATCTTCTCTC AGCAACCTGA GTCTTCGCCG TTCCTCAGAG CGCCTCAGTG    60
ACACCCCTGG ATCCTTCCAG TCACCTTCCC TGGAAATTCT GCTGTCCAGC TGCTCCCTGT   120
GCCGTGCCTG TNATTCGCTG GTGTATGATG AGGAAATCAT GGCTGGCTGG GCACCTGATG   180
ACTCTAACCT CAACACAACC TGCCCCTTCT GCGCCTGCCC CTTTNTGCCC CTGCTCAGTG   240
TCCAGACCNT TGATTCCCGG CCCAGTGTCC CCAGCCCCAA ATCTGCTGGT GCCAGTGGCA   300
GCAAAGATGC TCCTGTCCCT GGTGGTCCTG GCCCTGTGCT CAGTGACCGA AGCTCTGCCT   360
TGCTCTGGAT GAGCCCCAGC TCTGCAACGG GCACATGGGG GGAGCCTCCC GGCGGGTTGA   420
GAGTGGGGCA TGGGCATACC TGAGCCCCCT GGTGCTGCGT AACGAGCTGG AGTCGCTGGT   480
AGAGAACGAG GGCAGTGAGG TGCTGGCGTT GCCTGAACTG CCCTCTGCCC ACCCCATCAT   540
CTTCTGGAAC CTTTTGTGGT ATTTCCAACG GCTACGNCTG CCCAGTATTC TACCAGGCCT   600
GGTGCTGGCC TCCTGTGATG GGCCTTCGMA CTCCCAGGCC CCATCTCCTT GGCTAACCCC   660
```

TGATCCAGCC TCTGTTCAGG TACGGCTGCT GTGGGATGTA CTGACCCCTG ACCCCAATAG 720
CTGCCCACCT CTCTATGTGC TCTGGAGGGT CCACAGCCAG ATCCCCCAGC GGGTGGTATG 780
GCCAGGCCCT GTACCTGCAT CCCTTAGTTT GGCACTGTTG GAGTCAGTGC TGCGCCATGT 840
TGGACTCAAT GAAGTGCACA AGGCTGTGGG GCTCCTGCTG GAAACTCTAG GGCCCCCACC 900
CACTGGCCTG CACCTGCAGA GGGGAATCTA CCGTGAGATA TTATTCCTGA CAATGGCTGC 960
TCTGGGCAAG GACCACGTGG ACATAGTGGC CTTCGATAAG AAGTACAAGT CTGCCTTTAA 1020
CAAGCTGGCC AGCAGCATGG GCAAGGAGGA GCTGAGGCAC CGGCGGGCGC AGATGCCCAC 1080
TCCCAAGGCC ATTGACTGCC GAAAATGTTT TGGAGCACCT CCAGAATGCT AGAGACCTTA 1140
AGCTTCCCTC TCCAGCCTAG GGTGGGGAAG TGAGGAAGAA GGGATTCTAG AGTTAAACTG 1200
CTTCCCTGTT GCCTTCATGG AGTTGGGAAC AGGCTGGGAA GGATGCCCAG TCAAAGGCTC 1260
CAAGCGAGGA CAACAGGAAG ACGGATCCAC TGTTACCAAA AGTCCTGATT CCCCCATCAC 1320
CAACCTACCC AGTTTGTTCG TGCTGATGTT GGGGGAGATC TGGGGGGAGT TGGTACAGCT 1380
CTGTTCTTCC CTTGTCCTAT ACCGGGAACT CCCCTCCAGG GTACCCACAG ATCTGCATTG 1440
CCCTGGTCAT TTTAGAAGTT TTTGTTTTAA AAAACAACTG GAAAGATGCA GAGCTACTGA 1500
GCCTTTGCCC TGAATGGGAG GTAGGGATGT CATTCTCCAC CAATAATGGT CCCTCTTCCC 1560
TGACGTTGCT GAAGGAGCCC AAGGCTCTCC ATGCCTTTCT ACCTAAGTGT TTGTATTTTA 1620
TTTTAAATTA TTTATTCTGG AGCCACAGCC CCCTTGCTTA TGAGGTTCTT ATGGAGAGTG 1680
AGAAAGGGAA GGGAAATAGG GCACCATGGT CCGGTGGTTT GTAGTTCCTT CAAAGTCAGG 1740
CACTGGGAGC TAGAGGAGTC TCAAGCTCCC CTTAGGAAGA ACTGGTGCCC CCTCCAGTCC 1800
TAATTTTTCT TGCCTGCCCC GCCTTGGGGA ATGCCTCACC CACCCAGGTC CTGACCTGTG 1860
CAATAAGGAT TGTTCCCTGC GAAGTTTTGT TGGATGTAAA TATAGTAAAA GCTGCTTCTG 1920
TCTTTTTCAA AANAAAAAAA AAAAAAAACT 1950

(2) INFORMATION FOR SEQ ID NO: 132:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 990 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 132:

TGGAAGATTT AAAATAGGTT TCATATTTCT CTTGAATATG AATATATAAG CTTGAATAAG 60

CTTGAGTCCT TATTATTATG AAATTTTCCT TATTATTTCT ACCAATGCTT CTTATATTAA 120

AGCCTGATCT TTTTCATATT AGTACATGTA CATTAGCTGC CTGTGGATTA ACATTTCCAT 180

GAAATGTATT TTTGCATTGT TTGATCTTAA ACTTTTTGTG TCTTTATATA AGGTATGCTY 240

CTTTTAAGCA TGATATTTTT AACCACAATA GTTGAAAGAC AATCTYCACC TTTTACTTGT 300

ATATTTACAT GTAATGTAAT TTTTGATGCA TATTACGTCT TATTATTTAA CCAACCTATT 360

TTATTTTATC TAGGGCATTT TTCAGAAAGC CTTATTTTCT TGTATTAATC AAATATTTTT 420

AYCATTGTAT TTTCCYTTAT TATTTAGKAA TACGKTACYC YAAATATATA TTGTGGSTAT 480

TTTCAGAATT GCAATATGCC TCCTTAATTT ATTAGAGGCT AACCTAAATT ATTACTTTTA 540

CCACTTACTT GAAAATTCTG GAACTTTAGA ACATTTATTG TTTTATGCAT TTTAATTCTA 600

CTTGTATTTT TACTACTCCT AAACATTATT ATTGTTTTAG ACAAGCCAAA ATATATNTTG 660

TTATTATCTT ATYCTCCATT TCTTTCTGTA TTTTTATGCC ACTATGTATG CTCAATTTCC 720

TTCTATGTGA TGAACCTAAT TCAGTACTTT TGTTTTTTAA TCTGTGCAGG TAGCCTGGCC 780

ATTAAATTTT TATTTTTGGT TTGCTGAAAA AATTGTGTTT ATTTCTATAT GCATACTTAT 840

GCATATAGAA TNCTAGGTNG ACATATTTTT AGTATTTATA AATGTAAAGT CATTWATTKG 900

GCTTCTATCA TTTCNGTNGA GAAATCAATT GTCAGCCCAA TAGTTTTTCA TTTTAAATTA 960

CNGAATTTTT TCATGTTTCT GGTTTTAGGA 990

(2) INFORMATION FOR SEQ ID NO: 133:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1720 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 133:

GTCTGATAAG CGACTGTGGT TATTCCCCTA AAGTTTACTT CAGCACTAAC ACTAGTGCTT 60

CCGCTGGAGT TTGCAGTTTT CCAGCTTTAT ACAGGATTTT CCTTTGACTG GAAGAGTCAA 120

GGATATAGAG ACTCAACAGT GACATTTATT GTACAACATC AAGGGGAATA GGATACTCAT 180

CAAACTGGGA TTATTCTTAT CAAAACATGG TCTTCTTTGA ATAAGAAAAA TACATAGTTG 240

GTTATTATGG ACTTAAAACT GTGTTAAATG GATATTCTGA TAAAATATTT GCTGCTCTGT 300

AGAGTGTGGA AAATCTGAGA ATATTAGCTT TACTCATCTT GAGCTTTGAG GATGTTCTCT 360

GTACGCCGAT GGTTTCATAT TAACTAAAAA AGCTGGGTAT TGTAAAATCT CATTTATAAA 420

AACTCAGATG AGAAGAAAAT TTTCTTTGAT GGTGAGACTG TTGTCTTAGT TCAGGAAATT 480

ATTTAATAAT CCTTTGTTAC CTGTGAATGA AGGAACTTTG TAATTCTGAT TTATCGTAAA 540
ACATGAGCCT TTCCAGAGTC AGCTTAGACA CTGTTGTCGC AAATAGCCAT GCTTTGCCTT 600
ATGCCAAGGA GGCCCAGAGG GAGGGCCTAG TCTTCCTCTG TTGCTGTACA TATATTGAAA 660
TGCTTTTTTT TTTTATTTTG CATTTGTTAT CTATAATGAG CTTTCTGAGC CCTGATATTA 720
TGTGAGACAA ACAGGAGTTA TTGATGTTAT ACACTCCCTT CCATTCAGGA TTTTCTGCTT 780
GGAGGGAAAT ATGTTGACCT TAGAGAATTG TGAATATTGT TGCAATTCTT GAATATATTA 840
CCATGTGAAT AATAGAGACT GTGTTGCTCT CTAGTATAAG CTATATTTAT TTTTGATTCA 900
TTTGAATTAC TAGTTATAAC TGGAGAAATT TTGTTACCTC TATCCTGGCT TGCCTGACTG 960
GCTGTATAAT AGCAGCAGCC TCTTTTAGAG CATCTTAATG AAAACATGGA TGAAAGGAAT 1020
TAATGATGAT ATCTGCAGAC TGCGTAGAAA ATGGCTTTTG TTCCCAGCGT TAACATTTTC 1080
TTCTCAATCA CATTTCAATG TTTGTGGAGA GTGGCAGATT CACACCAGAA ACACTAGGTG 1140
TTCATATCCA TAGCATGGAT GCAGAATAAG CAGTTGGGAG AGAAGCTTCT TCCTACCTGG 1200
TACTCCTCCC ATTCACCTCA GCCCAGCCCC AGACAGGCGT TAGCATTCAG TGTGGGCCCT 1260
CAGGCAGCCC TGAAGCCTGG CTGGGTCATC AGATGGGGGC AGCCTGTGAC GGGCACCAGC 1320
GGCCTGATTC CAGGGAAGAG TTCCTGGAGG GTGTTGGCTG TTTTTGTTAG CTCAGTTTTT 1380
TTCTGGGCTC CACCATTCCT AACTCCAGGT AGACAAGATA GATGTCACAC ACAACAATTT 1440
TAAAGTATTT TGCTTAGTGC ATTTTGTTTA TGATTGCAGT GTTTGTTTCT TATTTAATAG 1500
GCTTTTTACT TCATTCTATT AAATTTTAGT GTTTAGAAGA GGCGGGTACT GTCACTGTGT 1560
AAAATATGTA ATATTTTATA TGTTATACCA TGTCATATAT ACTTGCAATA TCAGACCTTG 1620
CATTCAATAT ACAATGCAAT TGACTCTTTG CAGACCTGCA TTTTTCAGTG AACAATAAAA 1680
AGATTGTCTG GCACTCCAAA AAAAAAAAAA AAAAAAAAAA 1720

(2) INFORMATION FOR SEQ ID NO: 134:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 705 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 134:

GGCACGAGGC CATCTGGGCT CATTCAGCAG GAAATAATGG AAAAAGCTGC AATATCCAGG 60
TGTTTACTAC AATCTGGAGG CAAGATCTTT CCTCAGTATG TGCTGATGTT TGGGTTGCTT 120

GTGGAATCAC AGACACTCCT AGAGGAGAAT GCTGTTCAAG GAACAGAACG TACTCTTGGA 180

TTAAATATAG CACCTTTTAT TAACCAGTTT CAGGTACCTA TACGTGTATT TTTGGACCTA 240

TCCTCATTGC CCTGTATACC TTTAAGCAAG CCAGTGGAAC TCTTAAGACT AGATTTAATG 300

ACTCCGTATT TGAACACCTC TAACAGAGAA GTAAAGGTAT ACGTTTGTNA AATCTGGGAA 360

GACTTGACTG CTATTCCATT TTGGGTATCA TATGTACCTT GATGAAGANG ATTAGGTTGG 420

GATACTTCAA GTGAAGCCTC CCACTGGAAA CAAGCTGCAG TTGTTTTAGA TAATCCCATC 480

CAGGTTGAAA TGGGAGAGGA ACTTGTACTC AGCATTCAGC ATCACAAAAG CAATGTCAGC 540

ATCACAGTAA AGCAATGAAG AGCAGTTTTC CAATGAAAAC TGTGTAAATA GAGCATCAAC 600

AAGTACAAAA TTCTTGTCTT AATTAGTGGG GGTATATAAA AATTCCTTGT AATGGTCAAA 660

TATTTTTTAA AATTGACATT AATAAAGCAT ATTTTAAAAG TTTCT 705

(2) INFORMATION FOR SEQ ID NO: 135:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 323 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 135:

AGCACACACC TCCTTTAGTT GCTCCTAAGG TCATGTTCAA CATTCGTGGA GTGCATTTTC 60

TGCTCAGGGA GCTTTCCCAG ACCCGGAATG TTTGGTGCTC ACAGACYCTG GCAAGGATCG 120

GTATTGCTGT TCCTCAGTTT TGCCTGGGGA AATGGAGGST CAGTGACGTT CAGTGACGTG 180

CCCAGAGTCA TGCCATTGGC GGGTGGCCCA GKGMTCCAGG TCTCCAGCAC CCCTCGGCCC 240

CCTCCTCACC AGGTCACATC ATCTCCTGGA TTAGAATCTG CTCACATAGT CTGTCCTGAA 300

AGGAAAAAAA AAAAAAAAAA AAC 323

(2) INFORMATION FOR SEQ ID NO: 136:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 582 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 136:

GGACGGAATG GTGCAACCCT CCTWAMTTTT CTKGKGCTGT TGACAACAGA GGGAGGGAGG 60

GAAAACATTT TTYGTGGGAG AATCCTACYT CTGCAGSGGA GCCCTTAAGC GATKGATTTT 120

GAATCTKGAC CCTTTACCAA CTAATTTTGA AGGAAGATAC CTTGGAAATA TTTGGCATTC 180

AGTGGGTTAC TGAAACAGCA TTAGTGAATT CATCTAGAGA ACTCTTTCAT TTATTCAGGC 240

AACAACTGTA CAACTTGGAA ACCTTGTTAC AGTCCAGTTG TGATTTTGGG AARGTATCAA 300

CTCTACACTG CAAAGCAGAC AATATTAGGC AGCAGTGTGT ACTATTTCTC CATTATGTTA 360

AAGTTTTCAT CTTCAGGTAT CTGAAAGTAC AGAATGCTGA GAGTCATGTT CCTGTCCATC 420

CTTATGAGGC TTTGGAGGCT CAGCTTCCCT CAGTGTTGAT TGATGAGCTT CATGGATTAC 480

TCTTGTATAT TGGACACCTA TCTGAACTTC CCAGTGTTAA TATAGGAGCA TTTGTAAATC 540

AAAACCAGAT TAAGGTTTGA CTGGTTTCAT TTGATTTTTA AG 582

(2) INFORMATION FOR SEQ ID NO: 137:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1021 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 137:

TTCGGCAGAG CCCTTGCGCG CTCTTGAATA CCTGCKTTCT GTAGCGCTAG TTCTCTTCAA 60

GATTTGCTTA GTGTCATTTC ATTTCGGTTT CTTTTCTCGC CATGTTTTTC TGTCGGAATT 120

ACGGTTCGTT TTGGTTCTAT GTACTCTCTA AAATGTTATC GTTTTTCATT TGTCTACTAA 180

TTTTCGTGCA TTTGTTACTA CTGAGTTTCT TAATATCTGA CTGGCCTCCG CCCACGGGCT 240

CTGCAGANCA TAAAATACTC AGGCTGATGG TAGTGCAGAG ACTCTCCCTC CTTGATCAGC 300

GCAAACGTTG GTCTGAGGCT TGAGGGATGG AGCAACATTT TCTTGGCTGT GTGAAGCGGG 360

CTTGGGATTC CGCAGAGGTG GCGCCAGAGC CCCAGCCTCC ACCTATTGTG AGTTCAGAAG 420

ATCGTGGGCC GTGGCCTCTT CCTTTGTATC CAGTACTAGG AGAGTACTCA CTGGACAGCT 480

GTGATTTGGG ACTGCTTTCC AGCCCTTGCT GGCGGCTGCC CGGAGTCTAC TGGCAAAACG 540

GACTCTCTCC TGGAGTCCAG AGCACCTTGG AACCAAGTAC AGCGAAGCCC ACTGAGTTCA 600

GTTGGCCGGG GACACAGAAG CAGCAAGARG CACCCGTAGA AKARGTGGGG CAGGCAGARG 660

AACCCGACAG ACTCAGGCTC CRGCAGCTTC CCTGGAGCAG TCCTCTCCAT CCYTGGGACA 720

GACAGCAGGA CACCGAGGTC TGTGACAGCG GGTGCCTTTT GGAACGCCGC CATCCTCCTG 780

CCCTCCAGCC GTGGCGCCAC CTCCCGGGTT TCTCAGACTG CCTGGAGTGG ATTCTTCGCG 840

TTGGTTTTGC CGCGTTCTCT GTACTCTGGG CGTGCTGTTC ACGGATCTGT GGAGCTAAGC 900

AGCCTTAGAT AGCAGCAGAA GGCTTTTTGG ATTCTCCTCC TTGAAAAGAT TCTCAGTTAC 960

CAAACGTCTC CACCTAGAAA ATAAAAATAC ATTAAGATGT TGANAAAAAA AAANAAAAAA 1020

A 1021

(2) INFORMATION FOR SEQ ID NO: 138:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1777 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 138:

CGGAAGATGA TGGCTTCAAC AGATCCATTC ATGAAGTGAT ACTAAAAAAT ATTACTTGGT 60

ATTCAGAACG AGTTTTAACT GAAATCTCCT TGGGGAGTCT CCTGATCCTG GTGGTAATAA 120

GAACCATTCA ATACAACATG ACTAGGACAC GAGACAAGTA CCTTCACACA AATTGTTTGG 180

CAGCTTTAGC AAATATGTCG GCACAGTTTC GTTCTCTCCA TCAGTATGCT GCCCAGAGGA 240

TCATCAGTTT ATTTTCTTTG CTGTCTAAAA AACACAACAA AGTTCTGGAA CAAGCCACAC 300

AGTCCTTGAG AGGTTCGCTG AGTTCTAATG ATGTTCCTCT ACCAGATTAT GCACAAGACC 360

TAAATGTCAT TGAAGAAGTG ATTCGAATGA TGTTAGAGAT CATCAACTCC TGCCTGACAA 420

ATTCCCTTCA CCACAACCCA AACTTGGTAT ACGCCCTGCT TTACAAACGC GATCTCTTTG 480

AACAATTTCG AACTCATCCT TCATTTCAGG ATATAATGCA AAATATTGAT CTGGTGATCT 540

CCTTCTTTAG CTCAAGGTTG CTGCAAGCTG GGAGCTGAGC TGTCAGTGGA ACGGGTCCTG 600

GAAATCATTA AGCAAGGCGT CGTTGCGCTG CCCAAAGACA GACTGAAGAA ATTTCCAGAA 660

TTGAAATTCA AATATGTGGA AGAGGAGCAG CCCGAGGAGT TTTTTATCCC CTATGTCTGG 720

TCTCTTGTCT ACAACTCAGC AGTCGGCCTG TACTGGAATC CACAGGACAT CCAGCTGTTC 780

ACCATGGATT CCGACTGAGG GCAGGATGCT CTCCCACCCG GACCCCTCCA GCCAAGCAGC 840

CCTTCAAGTT CTTTTATTTC TGGGTAACAG AAGTAGACAG ACAGGTTACT TGGTGTATCT 900

TCTGTTAAAG AGGATTGCAC GAGTGTGTTT TCCTCACACA CTTTGATTTG GAGAATTGGT 960

GCTAGTTGGC AATAGATAAC TCAGCGTAGA TAGTATTGCA AAAAGGGGAG GAAATACACA 1020

ACAATAATAA ATGTAAAAAC CTGCTATTCA ACATGCAGTT TTATTTCGAA GCCAAAAATC 1080

TAGAGCTTTC CCAAGATCCT GTTGCCTTAG GCACATNCAC ACTTCAACAG TGCACACTAT 1140

CCAACAGTGC ACACTATTCA ACAGTGCACA CTATTCAAAA GCGTAGACTA TTTTTTTGCA 1200

TGTTCAAGAT ATTTGTTTTG GTCTTATGTG TGTGTGAGAG AGAGAGATTC CTTTGACATT 1260

AAGGAGCATC AATGAGAAAA GATGATGAGG CAGGAATTAA TAAAGAAATG AAGTCGTGTG 1320

TGTTTGGTTG CCTGTCAGAG GGCACACAAT TTCATAAACA CCATGCCTGG ACAATTTGAT 1380

ATTAATATTT AACACCTCTG CATCTTTTTC TTAAAAAAGA ATATGGGCCA GATACAGTGG 1440

CTCACATTTG TAATCCCAGC ACTTTGGGGA GCCAAGTTAG CAGAATCCCT TGAGCACAGG 1500

AATCTGAAAC CAGCTTGGGC AACATAGTGA GATCCCATCT NTACAAAAAA CTTAAAAATT 1560

AGCCAGGCAT GATGGCACAT TCCTGTAGTC CTAGCTACTC AGGAGGCTAA GGTAGGAGGA 1620

TTGCCTGAGC CCAGGAGTTC AAGGCTGCAG TGAGCTAAGN ACGTGCCAGT ACACTCCAGC 1680

CTGAGCCACA AAGTGAGACC CTGTCTCGCA AAAAAAAAAN TTAAAAAGTC GGGGGGGGCC 1740

CCGGTACCCA AATCGCCGGA TATGATCGTA AACAATC 1777

(2) INFORMATION FOR SEQ ID NO: 139:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 643 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 139:

TTTTTTTTTT TTTTTTTTTT TTTTTTTTTT TTTTTTTGGG AATGAGAAAA TAACTTTATT 60

TTCATTGTGG GGAGCGGGCC GATGTCCAGC CTCAGAACTT CTGGAACTGC TTCTTGGTGC 120

CGGCAGCCTT GGTGACCTTG AGCACGTTGA AGCGCACTGT CTTGCTCAGA GGCCGGCACT 180

CGCCCACTGT GACGATGTCA CCGATCTGGA CGTCCCTGAA GCAGGGGGAC AGGTGTACAG 240

ACATGTTCTT GTGGCGCTTC TCGAAGCGGT TGTACTTGCG GATGTAGTGC AGATAGTCTC 300

GGCGGATGAC AATGGTCCTC TGCATCTTCA TCTTGGGTCA CCACGCCAGA GAGGATCCGC 360

CCTCGAATGG ACACATTACC AGTGAAGGGG CATTTCTTGT CAATGTAGGT GCCCCTCAAT 420

AGCCTCCTTG GGGTGTCTTT GAAGCCCAGA CCGATGTTCT TGTTAGTAAC CCGCGGGAGC 480

TTCTCCTTGC CAGTTTCTCC CAGCAGGACC CTCTTCTTGT TTTGAAAGAT GGTCGGCTGC 540

TTTTGGTAGG CACGCTGAGT CTGAATGTCC GCCATCTTCT CGTGCCGMAY TCCTGCAGCC 600

CGGGGGATCC ACTAGTTCTA GAGCGGCCGC ACCGCGGTGG AGC 643

(2) INFORMATION FOR SEQ ID NO: 140:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1220 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 140:

```
GGCACGAGGA TGATAGACCT ACTGGAGGAA TACATGGTTT ACAGGAAGCA TACCTACATR     60
AGGCTTGATG GCTCATCCAA GATCTCGGAG AGGCGAGACA TGGTTGCTGA TTTTCAGAAC    120
AGGAATGACA TCTTTGTGTT CCTGTTAAGC ACACGAGCTG GAGGACTGGG TATCAATCTC    180
ACTGCTGMAG ACACAGTGCA TTTTCTATGA TAGCGACTGG AACCCCACTG TGGACCAGCA    240
GGCCATGGAC AGGGCCCACC GCTTAGGGCA GACAAAGCAG GTTACTGTGT ACCGGCTCAT    300
CTGTAAAGGC ACCATTGAAG AACGCATTCT GCAAAGAGCC AAGGAGAAGA GTGAGATTCA    360
GCGGATGGTG ATTTCAGGTG GGAACTTCAA ACCAGATACC TTGAAACCCA AAGAGGTGGT    420
TAGTCTTCTT CTAGACGACG AAGAGTTGGA GAAGAAACGT ATGTACTCTA AACCTCTATA    480
CACTCCCCTC ACGTATCTGA GAATGGAAGA GGTACTTGGS TGTGTGCCAA GGGTTAGGCA    540
AAGCCAGAGG CTGTATTTAG GGAAAGTATT TTTGTGCTCA TATTTTATAT AAAAACCCAA    600
ACAAGAATGT GTTTGTAGGC CAGGCGTGGT GGCTCGCGCC TCTAGTCTCA GCATTTCGGG    660
ARGCCAAAGT GGGCAGATCA CCTGARGTCA GGARTTTGAG TTTGARACCA GCCTGGCCMA    720
CGTTGTGAAA CCCCACCTCT ACTARGARTA CSGAAAATTG GTTGGGCATG GTGGCGGGCA    780
CCTGTAATTC CAGCACTTTG GGAGGCTGGG GCAGAANAAT TGCTTGAGCC CAGGAGGTGG    840
AGATTGCGGT GAGCCGAGAT YGTGCCATTG CAMTCCAGCC SGGGCAATAA GAGTGAAAYT    900
CCATCTTTTA AAAACAAACA AAAACAAAAA ACACAAGACG GCTCACACCT GTAATCCCAG    960
CACTTTGGGA RGCCGARGCA GGTGGATCAC GARGTCAGGA GTTCCAAGAC TAGCCTGGCC   1020
AACCTGGTGA AGCCCCGTCT CTACTAAAAA TACMAATATT AGTCGGGCGT GGTGGTGGGC   1080
ACGTGTAATC CCAGCTACTC GGGAGGCTGA GGCAGGAGAA TCCCTTGAAG CTAGGAGGCA   1140
GAGGTTGCAG TGAGCCAGGA TCGTGCCATT GCACTCCAGC CTGGACAACA AGAGCAAGAT   1200
TCCATCTCAA AAAAAAAAA                                                1220
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(2) INFORMATION FOR SEQ ID NO: 141:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 721 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 141:

AATTCGGCAC GAGCCAGGTT AGCCGGAAGG GCAGCTCTCC AGGCCCTGCC CACCCCACAG 60

GGGGCTCCTT ATGCACAGCG GGGCGTCTCC TTGTGGCCAT AGAAACGGAA CTGGCTCTTT 120

TCAACAGTGC TGCAAGAGGA TGGTTATTTA ACGCTGGCCC CCAAGGAGGA AAGGCACAGA 180

CYTTCCTCCC TCCTGGAACA TCCAAGGGCA CTGGATCCTC TGTGTCCCTC TGAGATGGGG 240

TGCCACTCCA GCAAGAGCAC CACGGTGGCA GCTGAGTCCC AGAAGCTTGA AGAAGAGYGC 300

GAGGGAAGAG AGCCAGGTCT GGAGACCGGC ACCCAGGCAG CAGACTGCAA GGATGCCCCG 360

CTGAAGGATG GAACCCCTGA GCCAAAGAGC TGAAATGCCT CTCTCCAGAG TCGGACCCTC 420

ACCTCYTTCC TGGAACTGCC TTTGGCCCCA GAACCATGAG ACAATCCCCA CCCTGAGAAG 480

CTCCGATCAC TGGGAGGAGA GAGAAAGCCT CCAGCTTTGG GATTCAGGCT TCAGAAGTTT 540

TTAGCAGCCT TTGCTCATTG GAGAGGTGGG GAAAGGATAA AGTTCTTATA AGGAAATCCC 600

TAATTTCCCC CAGCTCCTCC CCNCCNGAAG AAGGAACNAA AGAAAGTTCC TTCCACACGT 660

TTTGTTGGAA ACTTTTCCCT TGCCAACTTT CCTTGGATTG CCAGAACAAA GCCCTCCAGA 720

A 721

(2) INFORMATION FOR SEQ ID NO: 142:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1468 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 142:

ATGAATTAAT GTTTATAAAT GACTGTACTG AATTTAAAAC CGTACAGTTT CATTTGCATT 60

TTGACATTAC TTTATTATAC ATTTTGCATT TAAAAGGCTG CACCAGTTGG CTTTTCTTCT 120

GTTTTATTCT CAAAATATAG AGATTCTGTG ATTTATTTGC CCTGTTTATG GATTAAAAAG 180

AAAATTCTAA TATAAAGCAT TTCAATAGGA TGCATAGGTA TATTACGTTT TTTAAATGCT 240

TTAGATCTGT GATTCTTGAC TTACTATTTA TTTTATCCCC TTTAAGTCAG GGATGCTTTA 300

TTCTATTTTA AAGCACTTAT GAGTTACATG TTGTAATCAA GTTTGCACAA TATATTTATC 360

TATATGAGGA ACCCATAAAT GAATAGCTAA TTTTTAAAAT GCCATTAAAA TGCATGAAAT 420

KCTTATTAAA ACCTTACTAT ACTATTTCTT CAAGGCAAGT AAATTGACCA TGRGRAAAGR 480

ACACAGTTAT TAAACACTGT TGACAGGAAA ATTCTCCTTG ATAACATAGG ACAATTAATG 540

GAAAAAAAAA TTCTCATTAT TTGCAAAGAA TGAACAAGTT AATGAACAAA CAAACTAGAT 600

TTGGTATGTT TTCAGCTTTT GTATCATGTT TAATTGTTTA ATTTGGTTGA AAAACTGCAG 660

TTGAGAAATC AGATAGCAAT ATAGACATTC ACAGCAGCTC TGTGGATACC ATGTAATTGT 720

CAGGTAATTT CAGAATGTTG AAAATTATTC AGTGCAGCCC TCATAGTATC ATACTTGAAG 780

AAATTGATTA CAGTTCCACT AAATTGTTGA AGATAAATTA TTTTTAAAGG TTATGAAAAC 840

TAAGTTATAT TAATTCATAT GTTTGATTTT TAAATCCCAC CTCCTCAAGC TATCCAATTT 900

NCTGACTTTG AAAATAACCA TGAGAGATGC CACATTTCTC TCTGGGAAAC TACCACTCAA 960

AGAATAATTG TTAAAAATTA AGCTTTTAGG TATTAGAAGC TGTTATAAAG TATAAAATTA 1020

AGATATAAGC AGATCACATG TAAATCATTC CTAAAGCACA AGAAAAGAAT GTGCCTTGAT 1080

GTACATATAT TACTAAGTTG CCTCTCCCAG TTTACTTTAA AAATGGCTTT AAGGATAAAG 1140

AATAAATGTG ATAGCTGTGC ATGCATTATA TATTTGCATT TGCAAATTTC CCATTGTTTT 1200

AACAGCTGTG TGGCTGACTT TCAATTTTAA GACGTGAATT GACATACAGC CCATAACTTT 1260

ATAATGGCTG CTCATTTATC TTATCTTTCA GTTAGTGGAA AAACATTTCA ACCTGACTAA 1320

AATTTGGAAT TGTGTCTTTT ATGTTCCATC CTCTGTTGTT ACTAGATTTA GTTTAAAAAT 1380

TGTGTATGAC CATTAATGTA TGTCATAAAC ATGTAAATAA AAGATGTTGA ATCTTGTTGA 1440

AAAGCAWRAA AAAAAAAAAA AAACTCGA 1463

(2) INFORMATION FOR SEQ ID NO: 143:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 300 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 143:

TGAATTTTTT GCCAAACTTA GTAACTCTGT TAAATATTTG GAGGATTTAA AGAACATCCC 60

AGTTTGAATT CATTTCAAAC TTTTTAAATT TTTTTGTACT ATGTTTGGTT TTATTTTCCT 120

TCTGTTAATC TTTTGTATTC RCTTATGCTC TCGTACATTG AGTACTTTTA TTCCAAAACT 180

AGTGGGTTTT CTCTACTGGA AATTTTCAAT AAACCTGTCA TTATTGCTTA CTTTGATTAA 240

AAAAAAAAAA AAAAAAAAAA AAACCCCNAG GGGGGGGCCG GGTNCCCAAT CCCCCCCAAA 300

(2) INFORMATION FOR SEQ ID NO: 144:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2243 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 144:

```
TGCCTCCCTT CCTGCAGATT GTGGACAGTA GTTCCTCAGC CTGCACCCTG GATTCCTTCT     60
TCCCCTTCCT AGCTCCATGG GACTCGCCCC AAGACTGTGG CTTCAAGGAC CACCAGCCCC    120
TTACTCTTCA AGCCCTGACT GTGGAGTTGG TAGATGCCTC TGATCCTCAG TATTCTCTCT    180
GGCAATGTTC CACGGCTTCT CCTTCCTGGG AGCTGGCTCC ATAACTTGAT TTTCCCCAAA    240
CGTGTTGCAA TCCCTGCTGC CCCTTAGCCA CCCAGGGTCT TGTGTGGGTA TGAGTGTAGA    300
GGATGGGGGT ATGCCAGGCC TGGGCCGTCC CAGGCAGGCC CGCTGGACCC TGATGCTACT    360
CCTATCCACT GCCATGTACG GTGCCCATGC CCCATTGCTG GCACTGTGCC ATGTGGACGG    420
CCGAGTGCCC TTYCGGCCCT CCTCAGCCGT GCTGCTGACT GAGCTGACCA AGCTACTGTT    480
ATGCGCCTTC TCCCTTCTGG TAGGCTGGCA AGCATGGCCC CAGGGGCCCC CACCCTGGCG    540
CCAGGCTGCT CCCTTCGCAC TATCAGCCCT GCTCTATGGC GCTAACAACA ACCTGGTGAT    600
CTATCTTCAG CGTTACATGG ACCCCAGCAC CTACCAGGTG CTGAGTAATC TCAAGATTGG    660
AAGCACAGCT GTGCTCTACT GCCTCTGCCT CCGGCACCGC CTCTCTGTGC GTCAGGGGTT    720
AGCGCTGCTG CTGCTGATGG CTGCGGGAGC CTGCTATGCA GCAGGGGGCC TTCAAGTTCC    780
CGGGAACACC CTTCCCAGTC CCCCTCCAGC AGCTGCTGCC AGCCCCATGC CCCTGCATAT    840
CACTCCGCTA GGCCTGCTGC TCCTCATTCT GTACTGCCTC ATCTCAGGCT TGTCGTCAGT    900
GTACACAGAG CTGCTCATGA AGCGACAGNG GCTGCCCCTG GCACTTCAGA ACCTCTTCCT    960
CTACACTTTT GGTGTGCTTC TGAATCTAGG TCTGCATGCT GGCGGCGGCT CTGGCCCAGG   1020
SCTCCTGGAA GGTTTCTCAG GATGGGCAGC ACTCGTGGTG CTGAGCCAGG CACTAAATGG   1080
ACTGCTCATG TCTGCTGTCA TGAAGCATGG CAGCAGCATC ACACGCCTCT TTGTGGTGTC   1140
CTGCTCGCTG GTGGTCAACG CCGTGCTCTC AGCAGTCCTG CTACGGCTGC AGCTCACAGC   1200
CGCCTTCTTC CTGGCCACAT TGCTCATTGG CCTGGCCATG CGCCTGTACT ATGGCAGCCG   1260
CTAGTCCCTG ACAACTTCCA CCCTGATTCC GGACCCTGTA GATTGGGCGC CACCACCAGA   1320
TCCCCCTCCC AGGCCTTCCT GCCTCTCCCA TCAGCAGCCC TGTAACAAGT GCCTTGTGAG   1380
AAAAGCTGGA GAAGTGAGGG CAGCCAGGTT ATTCTCTGGA GGTTGGTGGA TGAAGGGGTA   1440
CCCCTAGGAG ATGTGAAGTG TGGGTTTGGT TAAGGAAATG CTTACCATCC CCCACCCCCA   1500
ACCAAGTTCT TCCAGACTAA AGAATTAAGG TAACATCAAT ACCTAGGCCT GAGAAATAAC   1560
```

CCCATCCTTG TTGGGCAGCT CCCTGCTTTG TCCTGCATGA ACAGAGTTGA TGAAAGTGGG 1620

GTGTGGGCAA CAAGTGGCTT TCCTTGCCTA CTTTAGTCAC CCAGCAGAGC CACTGGAGCT 1680

GGCTAGTCCA GCCCAGCCAT GGTGCATGAC TCTTCCATAA GGGATCCTCA CCCTTCCACT 1740

TTCATGCAAG AAGGCCCAGT TGCCACAGAT TATACAACCA TTACCCAAAC CACTCTGACA 1800

GTCTCCTCCA GTTCCAGCAA TGCCTAGAGA CATGCTCCCT GCCCTCTCCA CAGTGCTGCT 1860

CCCCACACCT AGCCTTTGTT CTGGAAACCC CAGAGAGGGC TGGGCTTGAC TCATCTCAGG 1920

GAATGTAGCC CCTGGGCCCT GGCTTAAGCC GACACTCCTG ACCTCTCTGT TCACCCTGAG 1980

GGCTGTCTTG AAGCCCGCTA CCCACTCTGA GGCTCCTAGG AGGTACCATG CTTCCCACTC 2040

TGGGGCCTGC CCCTGCCTAG CAGTCTCCCA GCTCCCAACA GCCTGGGGAA GCTCTGCACA 2100

GAGTGACCTG AGACCAGGTA CAGGAAACCT GTAGCTCAAT CAGTGTCTCT WTAACTGCAT 2160

AAGCAATAAG ATCTTAATAA AGTCTTCTAG GCTGTAGGGT GGTTCCTACA ACCACAGCCA 2220

AAAAAAAAAA AAAAAAACTC GAG 2243

(2) INFORMATION FOR SEQ ID NO: 145:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1082 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 145:

GCCAAGCTCT AATACGACTC ACTATAGGGA AAGCTGGTAC GCCTGCAGKT ACCGGTTCCG 60

GGAATTCCCG GGTCGACCCA CGCGTCCGCT TCCGTGTGTC AAAATCCTCA CCTCCTTCAT 120

AACCATCTCC CACAATTAAT TCTTGACTAT ATAAATTTAT GGTTTGATAA TATTATCAAT 180

TTGTAATCAA TTGAGATTTC TTTAGTGCTT GCTTTTCTGT GACTCAACTG CCCAGACACC 240

TCATTGTACT TGAAAACTGG AACANCTTGG GAATGCCATG GGGTTTGATA ATCTGCCAGG 300

GACATGAAGA GGCTCAGCTT CCTGGGACCA TGACTTTGGC TCAGCTGATC CTGNACATGG 360

GAGAACAACC ACATTTTTCT TTGTGTGTGC TTCTAGCAGC TGTTCGGGAG GACCKTGACC 420

CAAYAGTGTT CCCATGCTGT TTCTTGTGAA ATGCTCTCGG CTATGTAGCA GCTTTTGATT 480

CCCTGCATAC CCTAGGCTGC TGCCCCTATC CTGTCCCTTG TTTATAACAT TGAGAGGTTT 540

TCTAGGGCAC ATACTGAGTG AGAGCAGTGT TGAGAAGTCG GGGAAAATGG TGACTACTTT 600

TAGAGCAAGG CTGGGCATCA GCACCTGTCC AGCTCTACTT GTGTGATGTT TCAGGAACTC 660

AGCCCCTTTT TCTGCCTAGG ATAAGGAGCT GAAAGATTAA CTTGGATCTY CTAATGGTCC 720

AAATCTTTTG GTCACAATAA AGAGTCTCCA AATTAGAGAC TGCATGTTAG TTCTGGATGG 780

ATTTGGTGGC CTGACATGAT ACCCTGCCAG CTGTGAGGGG ACCCCGTTTT TAAGATGCAT 840

GGCCAAGCTC TCTGCAAATG GAAATGCTTA CACTGGGTGT TGGGGATGTT TGCTACCTCC 900

TGCTATTTTT GTGGTTTTGG TTCTCCCACT ATGGTAGGAC CCCTGGCCAG CATTGTGGCT 960

TGTCATGTCA GCCCCATTGA CTACCTTCTC ATGCTCTGAG GTACTACTGC CTCTGCAGCA 1020

CAAATTTCTA TTTCTGTCAA TAAAAGGAGA TGAAAATAAA AAANAAAAAA AAAAAACTCG 1080

NG 1082

(2) INFORMATION FOR SEQ ID NO: 146:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 4313 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 146:

CAAGCTGGTT TGAAACTAGG GGTCGGGCTC GGCCGTCGTC GTTGTTTGTC GCCGCATCCC 60

CGCTTCCGGG TTAGGCCGTT CCTGCCCGCC CCCTCCTCTC CTCCCTTCGG ACCCATAGAT 120

CTCAGGCTCG GCTCCCCGCC CGCCGCAGCC CACTGTTGAC CCGGCCCGTA CTGCGGCCCC 180

GTGGCCACCA TGTCCCTGCA CGGCAAACGG AAGGAGATCT ACAAGTATGA AGCGCCCTGG 240

ACAGTCTACG CGATGAACTG GAGTGTGCGG CCCGATAAGC GCTTTCGCTT GGCGCTGGGC 300

AGCTTCGTGG AGGAGTACAA CAACAAGGTT CAGCTTGTTG GTTTAGATGA GGAGAGTTCA 360

GAGTTTATTT GCAGAAACAC CTTTGACCAC CCATACCCCA CCACAAAGCT CATGTGGATC 420

CCTGACACAA AAGGCGTCTA TCCAGACCTA CTGGCAACAA GCGGTGACTA TCTCCGTGTG 480

TGGAGGGTTG GTGAAACAGA GACCAGGCTG GAGTGTTTGC TAAACAATAA TAAGAACTCT 540

GATTTCTGTG CTCCCCTGAC CTCCTTTGAC TGGAATGAGG TGGATCCTTA TCTTTTAGGT 600

ACCTCAAGCA TTGATACGAC ATGCACCATC TGGGGGCTGG AGACAGGGCA GGTGTTAGGG 660

CGAGTGAATC TCGTGTCTGG CCACGTGAAG ACCCAGCTGA TCGCCCATGA CAAAGAGGTC 720

TATGATATTG CATTTAGCCG GGCCGGGGGT GGCAGGGACA TGTTTGCCTC TGTGGGTGCT 780

GATGGCTCGG TGCGGATGTT TGACCTCCGC CATCTAGAAC ACAGCACCAT CATTTACGAA 840

GACCCACAGC ATCACCCACT GCTTCGCCTC TGCTGGAACA AGCAGGACCC TAACTACCTG 900

GCCACCATGG CCATGGATGG AATGGAGGTG GTGATTCTAG ATGTCCGGGT TCCTGCACAC 960

CTGTSGCCAG GTTAAACAAC CATCGAGCAT GTGTCAATGG CATTGCTTGG GCCCCACATT 1020

CATCCTGCCA CATCTGCACT GCAGCGGATG ACCACCAGGC TCTCATCTGG GACATCCAGC 1080

AAATGCCCCG AGCCATTGAG GACCCTATCC TGGCCTACAC AGCTGNAAGG WGAGATCAAC 1140

AATGTGCAGT GGGCATCAAC TCAGCCCGAA YTGTCGCCAT CTGCTACAAC AACTGCCTGG 1200

AGATACTCAG AGTGTAGTGT TGGTGGCGCT GTGCCCACGA GGCAGGGGCT TTTGTATTTC 1260

CTGCCTCTGC CCCACCCCCA AAGTAAGAAG AAACATGTTT CCAGTGGCCA GTATGTCTTT 1320

CATTGCTTTG CACCCACTGT TACCAGAAGC TGCTCTAGGA GTTCCTGGCC AGTCACCCCA 1380

TCGCCCTCTG TGGCAGACTC AGTGCTGTGT GGCGCCTCCT CAGCCCAGGG CTGAGTTTTA 1440

AGATTTTCTC TCCTTTCCTC TTCTCCTTTG GTTCCTCAAT TAAAAAATGT GTGTATATTT 1500

GTTTGTCAGG CGTTGTGTTG AGGAGCAGTT CACGCACTGG CTGTGTCTAT TCCTCTGCCC 1560

AGGTGTCTCT GTTTGCTGCC CAAKGYWKKT TTTCATGTCT CGTCCATGTC CATGTTCGTG 1620

TTAGCACTWA CGTGGGAACA AATACCAATT TGTCTTTTCT CCTAGTATCA GTGTGTTTAA 1680

CAAATTTTAA CTTTGTATAT TTGTTATCTA TCAGGCTAAT TTTTTTATGA AAAGAATTTT 1740

ACTCTCCTGC TTCATTTCTT TGTCTTATAG TCCTCCCTCT TTGCACCTTC TTCTCTTCCC 1800

TCAGTGCCTG GAGCTGGTAC TGGGCCCCTG GCCCCATGAG CAGTTTGCCT TCTTGAGTCA 1860

CTGCCTGTGT AGTACATACC TGACCGGGAG TCCAAACCAC CTTGGTGCTC TGAAGTCCAC 1920

TGACTCATCA CACCTTTCTT AGCCTGGCTC CTCTCAAGGG CATTCTGGGC TTGTAAACAG 1980

ACATAGGAAG CCTCTGTTTA CCCTGAAGCA CCACTGTCCA GCCCATTGGT TCCCACTGGC 2040

AGCATGGTAG AGCTGAGAGA AACAGGCTCT CAGGGTACCT GACTTGAGGG GAATCGTTTC 2100

ATGAAGCTGA ACTTCAAGCA TATTTCCAGT ACATTCTTTC AGAGTCTGTT TTTCCATCCA 2160

AATATAAGGC CCAGGCCATT CCACTTAGTG TCTTTTCAAT GATAGGCAAG AATGATATCT 2220

GAGTTGAACT TCGGTGCTTC TGTTGTTTGA GTTTACTGTG CCTGGTGGTA TATTGGGCAT 2280

TCTTTGGATT GAGTGTTCTG AGGTGAGAGA GTCTTCCCGA GGCATCCTGT CTGTGCTTCC 2340

AACCCTGAAC AAGACCTTAG ATGAGAGATG GACTGATGGA CTGCGGCAAT CCTGGGCTGT 2400

CAAGTGGATA GATAGTTAAA AAGCATTATA CTGTGGGTAA TGAAAAGGGA GGAAAAAAAA 2460

AGAAGGAAAA GGAATTATAG ACCCCCAGGG TCAGCCAGTT AAGAGCTCTA CCCACACCTG 2520

TCAACCCCTC TCTCCCCCAG TTTAGGTTCT GAGCAGTATT GGACTTGTAG CCTGCAGTTG 2580

TCTTTTGACT TGCAGGCCGC AGTGTCTTTC TGTTATGTGA ATGAGTTCCA TGGAGGGGCA 2640

TATGTGTGAT TCCACCGTTA GATGAGCCCT TGGGGCAGGC AGTTTGGGAT GTGCTCTTGG 2700

GGGAAAGTTG GCTGTTTCCT TGCGCTCTGC TCCTACCCGA AGTTTTTAAG TCCCTCTGAA 2760

TTGCTCATCT GAGATTAGTA GAGTAGCAGG CCTGAAGGAT GATGGTTTTG TCCTCTTTGG 2820

TTCTCACCTG CTTGAGAAGT AAAACAGTAA CTTTGTTCTT CTGGGCCCTT AAGCTTTTTT 2880

GGTTAAGTCT TCCTTTTCAG AAGTAGATGT CATTATATGC CAAAAGTCTA GCTCTTTGCT 2940

TTACCATACA GGGACCTGTC CCAAAGAAAA AGGCTCTTTT TTTAGCCAGC ATATTTCCCC 3000

TTCTACCCTT TTACTTTGTT GTTCTGATTT TAGGACTCTG GCTGGCCATG TGCTTGTGGT 3060

TGCCTCTCCT GCATTTGCCA CTGGATTTGC ACTGCATCGT TTGGAGATAC AAAGCGAGCA 3120

GTTCTTGGTC AGAACCCTCC TCTGCTTTTC ATTGTGTTTG ATAATGGTTA CTGGGTCCTT 3180

CTCTCAAGGG TAGCAAGGCC AAGCTGATGG CTGCTTGTTT AGGAGGCCAT CAGTTCCTTC 3240

CTGTGGAGAA GGGTCTGAAA TGGAAGTCAG TGGTAGAAGG GGCTGGTCTG CTGGGCAGGG 3300

CTTACATCCA CTGAGTTCTA AGATTCCTTT CCTGATCTGC ACCTACGCCT GGTCTGTATG 3360

GTGGAATTTG TCAGCTGGAA CTCAGAAACA ACAACTTGAA AAAAAAATAA TAATTAGAAC 3420

ATATTTGCAT AAGATAGCTA TTTACTCTGG AAACCAACAA CTTTTGAGAT TTCCCTTGCC 3480

CTGTGGACGC CCAGCTCCTG TCATCCTTCC TTAGGTCCTG CAGTACAGTC TTCCCCTGAA 3540

TGCCACCGGG GACCCAGGGG GACTCCACCC CCCTAAGCAA GCACACACAT ACTCACAGTT 3600

GATGAGTTGC TGGTCTTTGA GTCCCAGCTC TCTTACCCTC CCTTTACTCC ACCAGCCCGA 3660

CGACCCATGA CTGAGGAGGG GATTTCTACA GTCTCAGGAT TTAGAAAGTC TGTAAGCCAT 3720

CCATGCTCCA GAAAGCACCG ATCTGTTGTA GTTGCAAAAA CAACTCTGTA ATTTGTTGAG 3780

GTTCTCAAAC TGACAGCCAG CGAGACTGGG TGGGAGGCCC TGGATCTGTT CTCCCTGACT 3840

GCGGGAGGAG CAGCCACTAG GACTTTAGCA GGAAGCCCAC ATGGAGGCTC CGCCAGGCTG 3900

TGGCCCAGCT GGTGATGGCC CTTTTGCTCC TGGCAGCCTG AGGCACAGCT GCCTGTATTG 3960

TCCTCATCTG TTCTGACTGA AGGATGGAGG TGCTGAATAA ATTAGGCCTC AGGCNTCTAC 4020

CACCAGAGAG CTGGAGAATG GGTCCACGTC ATTCAAGGAC CTGAATTTTT TATGCTCAGG 4080

AGCATTGGAA TCCTCTTCTT CCAGGGAGGA ATTAGCCTGC AAGGTTAGGA CTTGAAGAGG 4140

GAAGGTATTT AATAACTGGG CGAGGATGGG TGTGGTGGCT CACACCTGTA ATCCCAGCAT 4200

TTTGGGAGGC TGAGGTGGCC AGATCCCAAG GTCAGAAGAT CGAGACCATC CTGGCTAACA 4260

TGGTGAAACC CCATCTCTAC TAAAAATACA AAATTAAATT GGCCGGGCGT GAA 4313

(2) INFORMATION FOR SEQ ID NO: 147:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 1183 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 147:

```
GGCAGAGCCT CAAGCTGACT TGGATTATGT GGTCCCTCAA ATCTACCGAC ACATGCAGGA     60
GGAGTTCCGG GGCCGGTTAG AGAGGACCAA ATCTCAGGGT CCCCTGACTG TGGCTGCTTA    120
TCAKWYGGGG AGTGTCTACT CAGCTGCTAT GGTCACAGCC CTCACCCTGT TGGCCTTCCC    180
ACTTCTGCTG TTGCATGCGG AGCGCATCAG CCTTGTGTTC CTGCTTCTGT TTCTGCAGAG    240
CTTCCTTCTC CTACATCTGC TTGCTGCTGG GATACCCGTC ACCACCCCTG GTCCTTTTAC    300
TGTGCCATGG CAGGCAGTCT CGGCTTGGGC CCTCATGGCC ACACAGACCT TCTACTCCAC    360
AGGCCACCAG CCTGTCTTTC CAGCCATCCA TTGGCATGCA GCCTTCGTGG GATTCCCAGA    420
GGGTCATGGC TCCTGTACTT GGCTGCCTGC TTTGCTAGTG GGAGCCAACA CCTTTGCCTC    480
CCACCTCCTC TTTGCAGTAG GTTGCCCACT GCTCCTGCTC TGGCCTTTCC TGTGTGAGAG    540
TCAAGGGCTG CGGAAGAGAC AGCAGCCCCC AGGGAATGAA GCTGATGCCA GAGTCAGACC    600
CGAGGAGGAA GAGGAGCCAC TGATGGAGAT GCGGCTCCGG GATGCGCCTC AGCACTTCTA    660
TGCAGCACTG CTGCAGCTGG GCCTCAAGTA CCTCTTTATC CTTGGTATTC AGATTCTGGC    720
CTGTGCCTTG GCAGCCTCCA TCCTTCGCAG GCATCTCATG GTCTGGAAAG TGTTTGCCCC    780
TAAGTTCATA TTTGAGGCTG TGGGCTTCAT TGTGAGCAGC GTGGGACTTC TCCTGGGCAT    840
AGCTTTGGTG ATGAGAGTGG ATGGTGCTGT GAGCTCCTGG TTCAGGCAGC TATTTCTGGC    900
CCAGCAGAGG TAGCCTAGTC TGTGATTACT GGCACTTGGC TACAGAGAGT GCTGGAGAAC    960
AGTGTAGCCT GGCCTGTACA GGTACTGGAT GATCTGCAAG ACAGGCTCAG CCATACTCTT   1020
ACTATCATGC AGCCAGGGGC CGCTGACATC TANGACTTCA TTATTCWATR ATTCAGGACC   1080
ACAGTGGAGT ATGATCCCTA ACTCCTGATT TGGATGCATC TGAGGGACAA GGGGGKCGGT   1140
STCCGAAGTG GAATAAAATA GGCGGGCGTG GTGACTTGCA CCT                     1183
```

(2) INFORMATION FOR SEQ ID NO: 148:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 734 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 148:

```
GAATTCGGCA GAGTGAAGCA TTAGAATGAT TCCAACACTG CTCTTCTGCA CCATGAGACC     60
```

AACCCAGGGC AAGATCCCAT CCCATCACAT CAGCCTACCT CCCTCCTGGC TGCTGGCCAK 120

GATGTCGCCA GCATTACCTT CCACTGCCTT TCTCCCTGGG AAGCAGCACA GCTGAGACTG 180

GGCACCAGGC CACCTCTGTT GGGACCCACA GGAAAGAGTG TGGCAGCAAC TGCMTGGCTG 240

ACCTTTCTAT CTTCTCTAGG CTCAGGTACT GCTCCTCCAT GCCCATGGYT GGGCCGTGGG 300

GAGAAGAAGC TCTCATACGC CTTCCCACTC CCTCTGGTTT ATAGGACTTC ACTCCCTAGC 360

CAACAGGAGA GGAGGCCTCC TGGGGTTTCC CCRRGGCAGT AGGTCAAACG ACCTCATCAC 420

AGTCTTCCTT CCTCTTCAAG CGTTTCATGT TGAACACAGC TCTCTCCRCT CCCTTGTGAT 480

TTCTGAGGGT CACCACTGCC ARCCTCAGGC AACATAGAGA GCCTCCTGTT CTTTCTATGC 540

TTGGTCTGAC TGAGCCTAAA GTTGAGAAAA TGGGTGCCAA GGCCAGTGCC AGTGTCTTGG 600

GGCCCCTTTG GCTCTCCCTC ACTCTCTGAG GCTCCAGCTG GTCCTGGGAC ATGCAGCCAG 660

GACTGTGAGT CTGGGCASGT CCAAGGCCTG CACCTTCAAG AAGTGGAATA AATGTGGCCT 720

TTGCTTCTAT TTAA 734

(2) INFORMATION FOR SEQ ID NO: 149:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1405 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 149:

GGCACAGTGG ACCCCAGACT CCCTCTCCGC CTTTCTCTGC CTGGGGAGAC CCACTGTGTG 60

CATGGCATCA CTGACTCCCA TACCTCTGGC TATCAAAGGT TTCTGCCATG GCCACCCTGG 120

AAGSAAACCA GAGGGAGGTA GACAGGGAGA TCAGGTCCCT TCTACTCTGG TTCCTGCTCT 180

GTGAAATTGT CTCAGGCTGG CTGTGTCCAG ARGGTCCCTG GTTCTCTCAR GGATGCCAAA 240

TCTACAAGAA TCTCTCCTCT TCCAGTTCCT ATAACCTCTC CTTCCTTTTG TCTCTTTAGA 300

CCTTGGAGTA GTAGCAGCCA GGTTCTTTCT ATCTCTGGGT TAGTGCATTA TCTCTGGTGG 360

CTCCCTTACC CAGGACTTTG GGAATGGTCT TTTTGTAATA CATTCTCCTC AAATAATTCA 420

ATTTTGAGTG TTCTGTATGT ATCCTGCTGG GAGGTTGTTA TATACAAATC ACTGTGCCCG 480

TTTAGCAGAG AAGGAGACTG AAGCTCAGGG AGGTTAAGTG TCTTTCTCTA GGTCGTATTG 540

TGGAGAAAGT GGCTGACTGG GGACTTGAAT GAGGTCCCTA GTTTCATGCT CGGAGGGCAA 600

AGANGAATGT CCAATTGGCC TGAGATAAGC CTCTGGTAAA ATGTACTGTA CATAATAGGT 660

AATCAATAAA TGTTGGCTGA TGACAAACAT GTTTTCTTTG TTCATTAGTT ATAGTGATTA 720

TGTTCTAAAT AACTCCMACA AGGAARTCAG CACATTTGGA ATATCAWTAT CTTTCCATGA 780

TAATATCTTT CCMYGGAAAG AWAATGATAT TCCMAACTGG GAGTGTCCCN AGCARATCTG 840

ANTCTGTGTA TTGGCCCTGG GGTGGGCCAG CCCCTTAGAC TCTATGGTCT CATTCTCTTT 900

GTTTACAAAA TTGAGATAAG GCCTTATTCT CTCCCCACCC CACCCATCCA TATTGTTTTG 960

AGAATAAAAT GAGAGGATGT GTGTCAAGGG TGTATTTTGG CAATAGTCTC TGAGCCATTT 1020

TCTGAGCACC TCCATACTGT TGACACTCAA GTAATATTTC ATCAGCATTC CATTCAGGNT 1080

CCTCCCTTAA TGAGGTGTGC GATGTACAAG AGTYGTGAGG TGGCAAAGGA TGGGCTCCTG 1140

AGGAAACACT TAGGAAACTG GGCTTTCTGC CATTAAAAGA GACAAACCTT TGTGGTGACC 1200

TAATTAAAGT TTTTAAAATT CAATTTGGAA AGTTAGCAAG CTAGCTCCTK TCCAGGWAAA 1260

ATAAGGAGTC AGTGCATGAC CTAACCGGTC CCGGGCTGCT TGCCATTCCA AACAACTGCA 1320

GTAAGTTTAT CACNTTCTTT CAGGGACTGA GGTTTCCAGG CACAGACTTG GATAAGGAAG 1380

GATGTCCTAT GGGGTCACAT TGATG 1405

(2) INFORMATION FOR SEQ ID NO: 150:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2890 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 150:

TTATATGCTA CAGCTACAGT AATTTCTTCT CCAAGCACAG AGGANCTTTC CCAGGATCAG 60

GGGGATCGCG CGTCACTTGA TGCTGCTGAC AGTGGTCGTG GGAGCTGGAC GTCATGCTCA 120

AGTGGCTCCC ATGATAATAT ACAGACGATC CAGCACCAGA GAAGCTGGGA GACTCTTCCA 180

TTCGGGCATA CTCACTTTGA TTATTCAGGG GATCCTGCAG GTTTATGGGC ATCAAGCAGC 240

CATATGGACC AAATTATGTT TTCTGATCAT AGCACAAAGT ATAACAGGCA AAATCAAAGT 300

AGAGAGAGCC TTGAACAAGC CCAGTCCCGA GCAAGCTGGG CGTCTTCCAC AGGTTACTGG 360

GGAGAAGACT CAGAAGGTGA CACAGGCACA ATAAAGCGGA GGGGTGGAAA GGATGTTTCC 420

ATTGAAGCCG AAAGCAGTAG CCTAACGTCT GTGACTACGG AAGAAACCAA GCCTGTCCCC 480

ATGCCTGCCC ACATAGCTGT GGCATCAAGT ACTACAAAGG GGCTCATTGC ACGAAAGGAG 540

GGCAGGTATC GAGAGCCCCC GCCCACCCCT CCCGGCTACA TTGGAATTCC CATTACTGAC 600

TTTCCAGAAG GGCACTCCCA TCCAGCCAGG AAACCGCCGG ACTACAACGT GGCCCTTCAG 660

AGATCGCGGA TGGTCGCACG ATCCTCCGAC ACAGCTGGGC CTTCATCCGT ACAGCAGCCA 720

CATGGGCATC CCACCAGCAG CAGGCCTGTG AACAAACCTC AGTGGCATAA AYCGAACGAG 780

TCTGACCCGC GCCTCGCCCC YTATCAGTCC CAAGGGTTTT CCACCGAGGA GGATGAAGAT 840

GAACAAGTTT CTGCTGTTTG AGGCACAGAC TTTTCTGGAA GCAGAGCGAG CCACCTGAAA 900

GGAGAGCACA AGAAGACGTC CTGAGCATTG GAGCCTTGGA ACTCACATTC TGAGGACGGT 960

GGACCAGTTT GCCTCCTTCC CTGCCTTAAA AGCAGCATGG GGSTTCTTCT CCCCTTCTTC 1020

CTTTCCCCTT TGCATGTGAA ATACTGTGAA GAAATTGCCC TGGCACTTTT CAGACTTTGT 1080

TGCTTGAAAT GCACAGTGCA GCAATCTTCG AGCTCCCACT GTTGCTGCCT GCCACATCAC 1140

ACAGTATCAT TCCAAATTCC AAGATCATCA CAACAAGATG ATTCACTCTG GCTGCACTTC 1200

TCAATGCCTG GAAGGATTTT TTTTAATCTT CCTTTTAGAT TTCAATCCAG TCCTAGCACT 1260

TGATCTCATT GGGATAATGA GAAAAGCTAG CCATTGAACT ACTTGGGGCC TTTAACCCAC 1320

CAAGGAAGAC AAAGAAAAAC AATGAAATCC TTTGAGTACA GTGCTTGTCC ACTTGTTTAC 1380

AATGTCCTCC TTTTAAAAAA AAAAAAATGA GTTTAAAGAT TTTGTTCAGA GAGTAAATAT 1440

ATATCCATTT AATGATTACA GTATTATTTT AAACCTTAAG TAGGGTTGCC AGCCTGGTTT 1500

CTGAAAAACC AAATATGCCG GACAGGGTGT GGCCACACCA AGAAGACGGG AAGACCTGGC 1560

TTGTGACCCT GGCTTCCCAT GTCCTTCTGG TCTCACCCGC GAAGTGCCCT ATCCTGGAAG 1620

TATGAAATGT TAGCCAATTA ATACCAAGAC ACCTCATCTG CTCCTTCCCC AGTGGATGGG 1680

GTTCTTCTGT AAAACTGTTT GCACATGGCC AGGGGAGGGA ACTAGGACCC TTGTGTCCTG 1740

TCTGAGCCTT ATGGAGGCAG GACGGTGTCA TTGGCGGATG TGTCCTGCTC CATTGAGATG 1800

GATGGCAAAC CCCATTTTTA AGTTATATTT CTTTGATTTT TGTTAATTTA GAGGTGTAGG 1860

TTTTGTTTTT TGTTTTTTTG TTTTTTTTTA AGAGAAACAT TTATAACTGG ATAGCATTGC 1920

AGTGAAAGCA GCTTGGGATG TTGGAGCTAA TGCCAGCTGT TTATACTGCT CTTTCAAGAC 1980

AGCCTCCCTT TATTGAATTG GCATTAGGGA ATAAACAAGC CTTTAAACGT GATAAAAGAT 2040

CAAAAACCTG GTTAGACATG CCAGCCTTTG CAAGGCAGGT TAGTCACCAA AGACTAACCT 2100

CCAAGTGGCT TTATGGACGC TGCATATAGA GAAGGCCTAA GTGTAGCAAC CATCTGCTCA 2160

CAGCTGCTAT TAACCCTATA ATGACTGAAA TGACCCCTCC ACTCTATTTT TGTGTTGTTT 2220

TGCACAGACT CCGGAAAAGT GAAGGCTGCC AATCTGAGTA GTACTCAAAT GTGAGGAACT 2280

GCTGGTCTTG GATTTTTTTT CCATTAAATT CAGCTGATCA TATTGATCAG TAGATAAACG 2340

TAAATAGCTT CAAATTTTAA AAGTGGAATT GCAGTGTTTT TTCACTGTAT CAAACAATGT 2400

CAGTGCTTTA TTTAATAATT CTCTTCTGTA TCATGGCATT TGTCTACTTG CTTATTACAT 2460

TGTCAATTAT GCATTTGTAA TTTTACATGT AATATGCATT ATTTGCCAGT TTTATTATAT 2520

AGGCTATGGA CCTCATGTGC ATATAGAAAG ACAGAAATCT AGCTCTACCA CAAGTTGCAC 2580

AAATGTTATC TAAGCATTAA GTAATTGTAG AACATAGGAC TGCTAATCTC AGTTCGCTCT 2640

GTGATGTCAA GTGCAGAATG TACAATTAAC TGGTGATTTC CTCATACTTT TGATACTACT 2700

TGTACCTGTA TGTCTTTTAG AAAGACATTG GTGGAGTCTG TATCCCTTTT GTATTTTTAA 2760

TACAATAATT GTACATATTG GTTATATTTT TGTTGAAGAT GGTAGAAATG TACTATGTTT 2820

ATGCTTCTAC ATCCAGTTTG TACAAGCTGG AAAATAAATA AATATAACAT AAAAAAAAAA 2880

AAAAAAAAAA 2890

(2) INFORMATION FOR SEQ ID NO: 151:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2399 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 151:

GAACTTTTCC ATCTGGCAAA CCGGAAACTC CATCCCCATT AAACCAACTC CCCCTTTTGG 60

TTTCCCCCCC AGNGGAATAG AATTTGGACN CCCATATAAA TCCAGGAAAC CACCTAAATT 120

CTTTAGTNGT TTGTGTTTGC AAGATCTAAG GTCATGGTAA ACATTAAGTT CTTAAAATTT 180

TTGGGAGGGA CCAGTGCACC TCTCCCTCTG AATTGTTCNC CAATTTAAAA TTGGAGTAAG 240

GTTTTAAAAT GTCTNATTCC ATTGGAAGGG TNTGTTATTT CATTTTGAGC CCAGAGGGGA 300

GAGGCACATT TTAAATATCA GAATTAGATT AGCTTTGAGT TTGTACAATT GGGAACATAA 360

TAGATTTTCA TAAATTATGT GTGCCTTGTT GGAAGTGTCA ACTGTCTTTA TGTCTGCTTG 420

TAAAAGTTTC AAAATATGTT TTCCCTCAAA AAGGCAACGT TACTTCATTT GCTTGAATAT 480

TATGATAGGA ATGCTTACTG ATATTACTTG ATAGTCATAT ATAGCCTAGG AAATTTAACA 540

TATATATAAC TATAGCAGTA TTAATAATGA TAGTTGTACT TCTTTAAAAC ATTAAATTTG 600

AGGAAACTTT AATGCTGTCT CGTGTACATT GCTTTACTAC AGTGAGGGGG AATATCCTTT 660

AGATTGAGCC TCAATTTACT GGTTAGTAGT ATGTGAACTC TGGTATAAAA ACGTAAACTA 720

GACAGTAGAG CCGATGAATT AAAATTGTAA ATTGCTACAT TGGCATTTTC TACCTCCTTT 780

TCTGTCAGAG TATTACTTTT TCCAGCATTT ATTCTTATTT GTGAGTAAAG AGGAAATGGG 840

AACCTGAGGT TAAAATTGAC ATTTTTGTTT CATTGAGAAT TTAAGCAGTA GGTACAGGAG 900

AAGTGACTTG TCACATTAAT TTGGTGCCTA AATCTGTAAC TACAAGTTGT GATCGACATG 960

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TACAAAATGT CTAAGAAAGG TCATATGCTG AATATTTTAC TTTTCCTGTA TAGTCTGCAT   1020
GATTTGTTTC ATAAACCCAG CTTATTTCCT CCAAAAAGCA AAATGGTCCT GTAATTTTTA   1080
AAGTAAAATA AACGTGCCAT TTTGTCTGCA ATCTATAATT TCAGGAAGTT ATTGRAAGTT   1140
CTGACTCAGG GCTTTTTAAC AGTTCAAGCA ATTGTCAGTT ATATTTTGGA AACTCCATCT   1200
GTGTAATTCT CCAGTGCCTT GAAAGAATTA TTAACTTGGC AACACTATTA AAACTTTATA   1260
AAAGATGGTC TTTAGTGCAC GTGTATCATT ATATACACGT TTTAAAGTCA TATTGCTTAG   1320
CTTGTTAATA ATGATTCTGC ATGTGTGCTG GGTTTGGGTA ATTCTTTAAA GGAAGTTTTC   1380
TAGATTTGCA CTTGATGTTT GTTTTTTAAA AACTGATTAT TTATGGCCGT GACACTGTTA   1440
CCAGAAAAGT AATTCTAATT AAGTTATTAT GCAAAGTCAT CTATAAGTAG CATCTGGGAA   1500
GAGGAGATSG AGGCCACAGT TTGCTATTTT AGTATGAAAG GAGGATCTGT TTGGGAAACA   1560
TAGATTGTCT TCCCCTCAAA TGAGGGGAAA AAAAAAGACC CTTTGTTCAA ATGGATTCTG   1620
TTGTAAAAAA TTATTTTTAA AGGAAATCAC AAATTGTATG TCATTCTTAA TGCTAGTCTT   1680
ATAGAATAAA TCCATAAAAT TGTTTTTATG TTCAGTATGT TTATGTCATT CTAAATGCAG   1740
CAAATTCAAT GATAGCAGTT CAATTGACTC ATAGCAGTGT TTTGTATTTT TTCTAATTCT   1800
TTAGCTTTCA ATATTGGATT AAAGTCTTGT TTGTGAATAT AGTTTCCGTA TGGCAAATGA   1860
TTTCTTGCTT ATTAGCTTTT GTTAAAGAAT GCTTAGTAAG AGCTAAGCTT TTAAAAGTAA   1920
TGCAAACATT TATCGTTAAT AAAACCTATG GTGTAATATC ATATAATGCT TTTCTTTGAT   1980
CTTTGGAGAA TTATTCTTTT ATAGTAGTAT ACATGAATTT TGATTTTTAA AGCATTTAAA   2040
AACAAATCTC AATACATTAA AAAACCTGTT ATTGTTAAAA RGGAAATTAC CATGCCTTTA   2100
AGAAACAAGG ATGTACATCT TCAATTCAGC ATRAGTGTCC ACATCTAGAA GGCTCTCATT   2160
GCAGTTGTTT ACAGTTAAGG TACCTCTATC TAAAGGGCCA AAGAAGCATT TCATAYTTTA   2220
ACACCTCACA TTCTTTCAGG ATTAAGACAT ATGAAAATAG TCTGAATAGG ATAAATTTGG   2280
ATAGGAAGTA ACTTAACCAG TCTGGGAAGA TTCAGGCTTT TTCTATKAAA AAGCTTATTC   2340
CTCTTCACAA CTCNGGTGGT AGGNTTTCAT TTTTCAAGAG GGTAGATATT TTAAAGCCA    2399
```

(2) INFORMATION FOR SEQ ID NO: 152:

(i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 802 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 152:

```
CGTGCCTGTA GTAAGCTCAT CCCTGCCTTT GAGATGGTGA TGCGTGCCAA CGACAATGTT     60
TACCACCTGG ACTGCTTTGC ATGTCAGCTT TGTAATCAGA GATTNTGTGT TGGAGACAAA    120
TTTTTCCTAA AGAATAACWT GAYCCTTTGC CARACGGACT ACGAGGAAGG TTTAATGAAA    180
GAAGGTTATG CACCCCMGGT TCGCTGATCT ATCAACATCA CCCCATTAAG AATACAAAGC    240
ACTACATTCT TTTATCTTTT TTGCTCCACA TGTACATAAG AATTGACACA GGAACCTACT    300
GAATAGCGTA GATATAGGAA GGCAGGATGG TTATATGGAA TAAAAGGCGG ACTGCATCTG    360
TATGTAGTGA AATTGCCCCA GTTCAGAGTT GAATGTTTAT TATTAAAGAA AAAAGTAATG    420
TACATATGGC TGGATTTTTT TGCTTGCTAT TCGTTTTTGT GTCACTTGGC ATGAGATGTT    480
TATTTTGGAC TATTGTATAT AATGTATTGT AATATTTGAA GCACAAAATGT AATACAGTTT    540
TATTGTGTTA CCATTTGTGT TCCATTTGCT YCTTTGTATT GTTGCATTTA GTACAATCAG    600
TGTTTAAACT TACTGTATAT TTATGCTTTC TGTATTTACC AGCTATTTTA AATGAGCTGT    660
AACTTTCTAG TAAAGAATTG AAAAGCAAAT CCTCACTAAA GGATACACAG GATAGGATAA    720
AGCCAAGTCN CATCAACATT AAAAAATACT AAAANANAAA ACACAAAAAA AAAAAANCCC    780
GGGGGGGGCC CGGAACCCAT TC                                             802
```

(2) INFORMATION FOR SEQ ID NO: 153:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 461 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 153:

```
CTAGGAGCAC CGAGCAGCTT GGCTAAAAGT AAGGGTGTCG TGCTGATGGC CCTGTGCGCA     60
CTGACCCGCG CTCTGCNCTC TCTGAACCTG GCGCCCCCGA CCGTCGCCGC CCCTGCCCCG    120
AGTCTGTTCC CCGCCGCCCA GATGATGAAC AATGGCCTCC TCCAACAGCC CTCTGCCTTG    180
ATGTTGCTCC CCTGCCGCCC AGTTCTTACT TCTGTGGCCC TTAATGCCAA CTTTGTGTCC    240
TGGAAGAGTC GTACCAAGTA CACCATTACA CCAGTGAAGA TGAGGAAGTC TGGGGGCCGA    300
GACCACACAG GTGGGAACAA CGACAGGGGG ATTTAAGCAG TCAAAAGGAA AAACATGTTA    360
AGACCCTAGA CTTGTATATT GACACACTTG TACCTTGTAA GGCAGAGGAA TGTAATTAAA    420
AAGCACTTAT TTGGCWNAAA AAAAAAAAAA AAAAAAAAAA C                        461
```

(2) INFORMATION FOR SEQ ID NO: 154:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2388 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 154:

```
GCCCACGCGT CCGAAAGCGG AGAACGCTGG TGGGCCTGTT GTGGAGTACG CTTTGGACTG    60
AGAAGCATCG AGGCTATAGG ACGCAGCTGT TGCCATGACG GCCCAGGGGG GCTGGTGGCT   120
AACCGAGGCC GGCGCTTCAA GTGGGCCATT GAGCTAAGCG GGCCTGGAGG AGGCAGCAGG   180
GGTCGAAGTG ACCGGGGCAG TGGCCAGGGA GACTCGCTCT ACCCAGTCGG TTACTTGGAC   240
AAGCAAGTGC CTGATACCAG CGTGCAAGAG ACAGACCGGA TCCTGGTGGA GAAGCGCTGC   300
TGGGACATCG CCTTGGGTCC CCTCAAACAG ATTCCCATGA ATCTCTTCAT CATGTACATG   360
GCAGGCAATA CTATCTCCAT CTTCCCTACT ATGATGGTGT GTATGATGGC CTGGCGACCC   420
ATTCAGGCAC TTATGGCCAT TTCAGCCACT TTCAAGATGT TAGAAAGTTC AAGCCAGAAG   480
TTTCTTCAGG GTTTGGTCTA TCTCATTGGG AACCTGATGG GTTTGGCATT GGCTGTTTAC   540
AAGTGCCAGT CCATGGGACT GTTACCTACA CATGCATCGG ATTGGTTAGC CTTCATTGAG   600
CCCCCTGAGA GAATGGAGTT CAGTGGTGGA GGACTGCTTT TGTGAACATG AGAAAGCAGC   660
GCCTGGTCCC TATGTATTTG GGTCTTATTT ACATCCTTCT TTAAGCCCAG TGGCTCCTCA   720
GCATACTCTT AAACTAATCA CTTATGTTAA AAAGAACCAA AAGACTCTTT TCTCCATGGT   780
GGGGTGACAG GTCCTAGAAG GACAATGTGC ATATTACGAC AAACACAAAG AAACTATACC   840
ATAACCCAAG GCTGAAAATA ATGTAGAAAA CTTTTATTTTT GTTTCCAGTA CAGAGCAAAA   900
CAACAACAAA AAAACATAAC TATGTAAACA AGAGAATAAC TGCTGCTAAA TCAAGAACTG   960
TTGCAGCATC TCCTTTCAAT AAATTAAATG GTTGAGAACA ATGCATAAAA AAAGTTGCAC  1020
AAGTTCCTTA TTTTCCTTAA TATTTCACTT CTATTTAATA CAAGCTGGGA CATAAAAATT  1080
CTGTTGGGGA TACCTGGGGG AAGATGTGAG AAACTAATGC TGAATTCAGC TTATACATGA  1140
TGAAAAGAAA AACCAGACAA AAGGAGCACA TAAATATGCA TACAGTGTAA CTGTTATTAT  1200
TTTAATACCC ACGATAAGGG ATTTTTGTTA GCATGTTTAG GGGGAACGAG GATTGGTGGG  1260
ATCCTTGGGG CCACAGGAAT CTGAGGCAAC GGAAGATATA TAGAGTGATC GTCCCCCTGC  1320
CGAAGGAACC TGGCAYCTGT CAAGCAGATG CTGCAGTTCA AACTTCAGCT TTTAAGATAG  1380
ATAGCTATTG AAGGCAGAGG GTCAGCAGGA GGATGTGTAT TTCTAATCTA CCCTGGTAAA  1440
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GTCATAGGTA AGACTCAAAA GCGGGATCTT ATTCAAAAGG CAGGTATTTC CTTTGTTTTC 1500

TGTCTTGAAA TAGCCCCTTC CCCTAAGGTG CATTCTCTCA AGTTTTCAGT ATTGCTTTAT 1560

TTGCAGTGAT TAAAAGAGAT GAGAGACTTT GGAGACAGAC AACGTAAGCA ACACATACAC 1620

ACATGAAATA CTCTAGACAG AGATGAATAT AAATCTGGCC TAATAACCAG TTTTCCATGT 1680

AACAGTGATT TTGTGTTTCG GGCTGAAGCA GTGGTTATAT TAAAAGCCAC TAATTCCCTT 1740

ATCCCTTTAA AAGATTTTTA CAATTCTCCA ACCACAAACA GCACTTCTAA AACTAACTTT 1800

ACTTTCTGCC CATAATTTGT TCTACATGGA AAAAAAAAAT ATTACTTTGG CCAGGGGTGT 1860

GTGTAAATGT GGCAGAATTC CTAGGCAGGC TGACCTTTAC AGTATGGGCC TTTAAGATAC 1920

TGGATCCTGG TTGGGCAACA AGTGTCACGC CTGAAGTTTC TGAAAACAAA TTAGAAGACT 1980

GTTGGCTTGG CTAATCTCGT AGTTCAGGGC CAAGTTTCTG TAGTCAGAAT GAAGAATAAA 2040

ATTGAAAGAA AAAGGGGGAA ATGCTTATAC TTGGCATTAA GTTGAATGCC TCAAGTCTTA 2100

ACTATGGCTT TGTAGATGAG GCAAAAGATT TCTTAGTGGT AAAATTTCTT CAACAGGTCA 2160

ATGCCAATCT GTATGCCATT TTAGTAAAGT AGGTAAGGAG AGTAGCCGCT CAGTAACTTT 2220

GGCACTAAAG AAAGAGTGTG GCTCTAGAAC TTCCAATCCC ATTGCTAGAT GTGCCCTTTA 2280

AAAGATGGTC CAGTGCTTTC AGGGAAGGAT GTTTAGCCAG TTTTCCTAGT ATTTGTTCCT 2340

TAAGATTTTT TGACCTGTGC TTAATAAGAC GGACGCGTGG GTCGACCC 2388

(2) INFORMATION FOR SEQ ID NO: 155:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 642 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 155:

AAAACAGACC ATTTAAAAAC TCAGACAAGA TTATATTTAA TATATTAATT ACTAAAAAGG 60

CACAAGATTA CACTGAACAT ATTAGCTACT AAAAAGGCAC TGCTAAGACA TTCAAGCAAA 120

TAGCTATTAC ACACTACTGC AGATTTTACA GGTTTCTAAT TCTAACATAT GTTTGAAAAA 180

TCCGTGAGTA TTCCAAAATA TATTTAATAA TGGAATATCT GCATTAATAT ACCATCCATG 240

TGTTTTTACC ATTTGCCTTA ATATTGAATA TACTGTTTAC CTCACACTAA AAAGAAAACC 300

AGAAGCCTTA TTTGTGATTT TGGGAGTGGA AGCTTCCATT TTTGTGTCAA AAATGAATCC 360

TGATTCTTAT GGAAATCTCT GTTATTAAGA TATTTCAAGA TGAGACAACA CTGAAGATCA 420

AATTGTGTTT AGTATCACTA TCTTCTCTCC TCGTTTCTCT CTTACTCCTC ATCCTCCCAG 480

AATCTACCAG TTTATGGTAG AAAGATGGGA ACCTTATTTG AATGTGTTTT TTTTTTTCCA 540

TGATGTCCAA TTTTGTTGTG GGAAAGGATT TGGATAAAAT TTTTGTTTAA ATTTTGGTAG 600

ATTTTTATCT ATACAAATTT AAATAAAATT ATGTTTTGTA AG 642

(2) INFORMATION FOR SEQ ID NO: 156:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1251 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 156:

GCCGCTGCCC CTCCACGGAG TTGCTGATCA TCTGGGCTGT GATCCACAAA CCCGGTTCTT 60

TGTCCCTCCT AATATCAAAC AGTGGATTGC CTTGCTGCAG AGGGGAAACT GCACGTTTAA 120

AGAGAAAATA TCACGGGCCG CTTTCCACAA TGCAGTTGCT GTAGTCATCT ACAATAATAA 180

ATCCAAAGAG GAGCCAGTTA CCATGACTCA TCCAGGCACT GAGCATATTA TTGCTGTCAT 240

GATAACAGAA TTGAGGGGTA AGGATATTTT GAGTTATCTG GAGAAAAACA TCTCTGTACA 300

AATGACAATA GCTGTTGGAA CTCGAATGCC ACCGAAGAAC TTCAGCCGTG GCTCTCTAGT 360

CTTCGTGTCA ATATCCTTTA TTGTTTTGAT GATTATTTCT TCAGCATGGC TCATATTCTA 420

CTTCATTCAG AAGATCAGGT ACACAAATGC ACGCGACAGG AACCAGCGTC GTCTCGGAGA 480

TGCAGCCAAG AAAGCCATCA GTAAATTGAC AACCAGGACA GTAAAGAAGG GTGACAAGGA 540

AACTGACCCA GACTTTGATC ATTGTGCAGT CTGCATAGAG AGCTATAAGC AGAATGATGT 600

CGTCCGAATT CTCCCCTGCA AGCATGTTTT CCACAAATCC TGCGTGGATC CCTGGCTTAG 660

TGAACATTGT ACCTGTCCTA TGTGCAAACT TAATATATTG AAGGCCCTGG GAATTGTGCC 720

GAATTTGCCA TGTACTGATA ACGTAGCATT CGATATGGAA AGGCTCACCA GAACCCAAGC 780

TGTTAACCGA AGATCAGCCC TCGGCGACCT CGCCGGCGAC AACTCCCTTG GCCTTGAGCC 840

ACTTCGAACT TCGGGGATCT CACCTCTTCC TCAGGATGGG GAGCTCACTC CGAGAACAGG 900

AGAAATCAAC ATTGCAGTAA CAAAAGAATG GTTTATTATT GCCAGTTTTG GCCTCCTCAG 960

TGCCCTCACA CTCTGCTACA TGATCATCAG AGCCACAGCT AGCTTGAATG CTAATGAGGT 1020

AGAATGGTTT TGAAGAAGAA AAAACCTGCT TTCTGACTGA TTTTGCCTTG AAGGAAAAAA 1080

GAACCTATTT TTGTGCATCA TTTACCAATC ATGCCACACA AGCATTTATT TTTAGTACAT 1140

TTTATTTTTT CATAAAATTG CTAATGCCAA AGCTTTGTAT TAAAAGAAAT AAATAATAAA 1200

ATAAAAAAAA AAAAACCCCG GGGGGGGCCC GGTCCCCAAT TGGCCCTATG G 1251

(2) INFORMATION FOR SEQ ID NO: 157:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2127 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 157:

CCGGCGGGAG AGGGAAGCTG CAGCGAGAGG CGCGGATCTC AGCGCGGGAG CAGTGCTTCT 60

GCGGCAGGCC CCTGAGGGAG GGAGCTGTCA GCCAGGGAAA ACCGAGAACA CCATCACCAT 120

GACAACCAGT CACCAGCCTC AGGACAGATA CAAAGCTGTC TGGCTTATCT TCTTCATGCT 180

GGGTCTGGGA ACGCTGCTCC CGTGGAATTT TTTCATGACG GCCACTCAGT ATTTCACAAA 240

CCGCCTGGAC ATGTCCCAGA ATGTGTCCTT GGTCACTGCT GAACTGAGCA AGGACGCCCA 300

GGCGTCAGCG CNCCCTGCAG CACCCTTGCC TGAGCGGAAC TCTCTCAGTG CCATCTTCAA 360

CAATGTCATG ACCCTATGTG CCATGCTGCC CCTGCTGTTA TTCACCTACC TCAACTCCTT 420

CCTGCATCAG AGGATCCCCC AGTCCGTACG GATCCTGGGC AGCCTGGTGG CCATCCTGCT 480

GGTGTTTCTG ATCACTGCCA TCCTGGTGAA GGTGCAGCTG GATGCTCTGC CCTTCTTTGT 540

CATCACCATG ATCAAGATCG TGCTCATTAA TTCATTTGGT GCCATCCTGC AGGGCAGCCT 600

GTTTGGTCTG GCTGGCCTTC TGCCTGCCAG CTRACACGGC CCCCATCATG AGTGGCCAGG 660

GCCTAGCAGG CTTCTTTGCC TCCGTGGCCA TGATCTGCGC TATTGCCAGT GGCTCGGAGC 720

TATCAGAAAG TGCCTTCGGC TACTTTATCA CAGCCTGTGC TGTKATCATT TTGACCATCA 780

TCTGTTACCT GGGCCTGCCC CGCCTGGAAT TCTACCGCTA CTACCAGCAG CTCAAGCTTG 840

AAGGACCCGG GGAGCAGGAG ACCAAGTTGG ACCTCATTAG CAAAGGAGAG GAGCCAAGAG 900

CAGGCAAAGA GGAATCTGGA GTTTCAGTCT CCAACTCTCA GCCCACCAAT GAAAGCCACT 960

CTATCAAAGC CATCCTGAAA AATATCTCAG TCCTGGCTTT CTCTGTCTGC TTCATCTTCA 1020

CTATCACCAT TGGGATGTTT CCAGCCGTGA CTGTTGAGGT CAAGTCCAGC ATCGCAGGCA 1080

GCAGCACCTG GGAACGTTAC TTCATTCCTG TGTCCTGTTT CTTGACTTTC AATATCTTTG 1140

ACTGGTTGGG CCGGAGCCTC ACAGCTGTAT TCATGTGGCC TGGGAAGGAC AGCCGCTGGC 1200

TGCCAAGCTG GNTGCTGGCC CGGCTGGTGT TTGTGCCACT GCTGCTGCTG TGCAACATTA 1260

AGCCCCGCCG CTACCTGACT GTGGTCTTCG AGCACGATGC CTGGTTCATC TTCTTCATGG 1320

CTGCCTTTGC CTTCTCCAAC GGCTACCTCG CCAGCCTCTG CATGTGCTTC GGGCCCAAGA 1380

AAGTGAAGCC AGCTGAGGCA GAGACCGCAG AGCCATCATG GCCTTCTTCC TGTGTCTGGG 1440

TCTGGCACTG GGGGCTGTTT TCTCCTTCCT GTTCCGGGCA ATTGTGTGAC AAAGGATGGA 1500

CAGAAGGACT GCCTGCCTCC CTCCCTGTCT GCCTCCTGCC CCTTCCTTCT GCCAGGGGTG 1560

ATCCTGAGTG GTCTGGCGGT TTTTTCTTCT AACTGACTTC TGCTTTCCAC GGCGTGTGCT 1620

GGGCCCGGAT CTCCAGGCCC TGGGGAGGGA GCCTCTGGAC GGACAGTGGG GACATTGTGG 1680

GTTTGGGGCT CAGAGTCGAG GGACGGGGTG TAGCCTCGGC ATTTGCTTGA GTTTCTCCAC 1740

TCTTGGCTCT GACTGATCCC TGCTTGTGCA GGCCAGTGGA GGCTCTTGGG CTTGGAGAAC 1800

ACGTGTGTCT CTGTGTATGT GTCTGTGTGT CTGCGTCCGT GTCTGTCAGA CTGTCTGCCT 1860

GTCCTGGGGT GGCTAGGAGC TGGGTCTGAC CGTTGTATGG TTTGACCTGA TATACTCCAT 1920

TCTCCCCTGC GCCTCCTCCT CTGTGTTCTC TCCATGTCCC CCTCCCAACT CCCCATGCCC 1980

AGTTCTTACC CATCATGCAC CCTGTACAGT TGCCACGTTA CTGCCTTTTT TAAAAATATA 2040

TTTGACAGAA ACCAGGTGCC TTCAGAGGCT CTCTGATTTA AATAAACCTT TCTTGTTTTT 2100

TTCTCCATGG AAAAAAAAAA AAAAAAA 2127

(2) INFORMATION FOR SEQ ID NO: 158:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1625 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 158:

CAAAAGATCT ATAATCAGGA CATTGTTTAT GTAAGTTGGA CAANAAAAAT TCTTCCCCTT 60

TATGTCCACC CTTCCTATGA TTGCAAGACA AAATTTCCCT CCTTTACCTC ATCCCTATAA 120

CATGGGAGGC TGAGAAAAAT GAGGGGAGAT GGAACCAGAT ACAAGGAGAT CCAATAAGAG 180

AAGCTTATTT AAATATTGTG AAATAAAGGA AGAMCCAAAG CATTTTTTTA AGTGGGGAAT 240

CCTTTTGAAC AGTTATTATT TATCCATATT ATTAAYAACA TCTTTTCTGA CAAAATCCAT 300

CAGATGAAGT GTAAATGGAT AATCTTTTAA TGGATCTAAA CCTAGAAAGT TTCACTTACT 360

GTTCATGTCC GTGTTCCAGA ATTGTGAAAT GGTGTGTGGT TTTGCTTTCC AAGTTCTTCT 420

CTGCCTCCTC TTAATTCTCT AATTCCATGT CTTACAGAAG AATGAGAAAT TTCTTTCTTA 480

CTTGAGTATC ATGCTCTAAA AAACTTGGCT TCAGTCACAG AAACGCTGGC TCTCCTGTGC 540

TTATATTGAA GCCAACTGCC TTTAATTCTT GGGCCCTCTT ATATTTTTAA GGTGCAAAAT 600

TTGAAGTCTC AGTCACCAGA CACAGGTTCT ATACAATTAA TGATGAGCTG GAGAAGTAAT 660
ATGTAGCTAA TTTTTCAAAA GCATTGAATA TACTTTCCGG AAAGAAAACA GAAATTAAAT 720
ATTGCCACAT CTTGCCAGAA TCCCATCTGA CACCTTAACT TTGTCAGGTT TCCTACAACT 780
TGCTAATCAA GTTTTATACA TTCTAAATCT CCCCAGTTTC TTTGGGGCTG GAAGATGCAA 840
CTTCCATTTA ATAGAAACTT TGAAATCTTG GGGTAAGGGA GCAGTGGGGG GACTAGGGAG 900
AAGGATAAGA AATAGAATTA TTGAAAAGCC CCCACCAGGG ACCTTCCTGG CCAGAATATG 960
CAGAGTAATT CCTGCTGGCT TCACCTTTGA AAGTCCCTCG AAACTATGCA GATGAAACTG 1020
AGTCTGTTTT TGATATTGTC AGATGTATTC TACCTTGGAA GTCCCNACAC CTAAACTGGA 1080
ATTCTTGTAT TTACATCTCC TCCACTGTCC CCCACACCAC CCCTCAATTC CTGCTGCCCC 1140
TGCTAATGTT AAGCATTTTT CTCTTGTTAT CATCAGGTTC ACATTAAAAM CAGRTACTTA 1200
CAAACTGACT TGAAGCACAG ATACTTTTAC GAATGTGATA AAATATTTTC TTAAGAAAAG 1260
GAAAGAGGAT GTGGGTCAAA TAAAACACCG CATGGATGTT GATTGGTGAA TACTGGTGTA 1320
AGAAAAGGGA GCTCAGGAAT TTTTATTACT GTATTTGTAA ATGAGTTTGA AGGAATTTGT 1380
AAATGCCACT GGTACATTTT TAAGGTGACA CATTTGCTCC TTATAAAGTT ATTAAAAATT 1440
ACAGGGTAAG CTTAAATGAC GTTTGCCAGT AGTTTTACTT TATATAATCA ATATTGATAT 1500
TGTTGCTGAA CTATGTAACT TTATGATGCA TTTTTCAGTC CCTTTTCAGA GCAAATGCTT 1560
TTGCAATGGT AGTAATGTTT AGTTTAAATT GACTTAATAA ATTMTTACCT GAGCAAAAAA 1620
AAAAA 1625

(2) INFORMATION FOR SEQ ID NO: 159:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1687 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 159:

CGGGGTCACC AGTTATTAGA GGAAGTAACA CAAGGGGATA TGAGTGCAGC AGACACATTT 60
CTGTCCGATC TGCCAAGGGA TGATATCTAT GTGTCAGATG TTGAGGACGA CGGTGATGAC 120
ACATCTCTGG ATAGTGACCT GGATCCAGAG GAGCTGGCAG GAGTCAGGGG ACATCAGGGT 180
CTAAGGGACC AAAAGCGTAT GCGACTTACT GAAGTGCAAG ATGATAAAGA GGAGGAGGAG 240
GAGGAGAATC CACTGCTGGT ACCACTGGAG GAAAAGGCAG TACTGCAGGA AGAACAAGCC 300
AACCTGTGGT TCTCAAAGGG CAGCTTTGCT GGGNATCGAG GACGATGCCG ATGAAGGCCC 360

TGGAGATCAG TCAGGCCCAG CTGTTATTTG AGAACCGGYG GAAGGGACGG CAGCAGCAGC 420

AGAAGCAGCA GCTGCCACAG ACACCCCCTT CCTGTTTGAA GACTGAGATA ATGTCTCCCC 480

TGTACCAAGA TGAAGCCCCT AAGGNAACAG AGGCTTCTTC GGGGACAGAA GCTGCCACTG 540

GCCTTGAAGG GGAAGAAAAG GATGGCATCT CAGACAGTGA TAGCAGTACT AGCAKTGAGG 600

AAGAAGAGAG CTGGGAACCC TCCGTGGTAA GAAGCGAASC GTGGGCCTAA AGTCAGATGA 660

TGACGGGTTT GAGATAGTGC CTATTGAGGA CCCAGCGAAA CATCGGATAC TGGACCCCGA 720

AGGCCTTGCT CTAGGTGCTG TTATTGCCTC TTCCAAAAAG GCCAAGAGAG ACCTCATAGA 780

TAACTCCTTC AACCGGTACA CATTTAATGA GGATGAGGGG GAGCTTCCGG AGTGGTTTGT 840

GCAAGAGGAA AAGCAGCACC GGATACGACA GTTGCCTGTT GGTAAGAAGG AGGTGGAGCA 900

TTACCGGAAA CGCTGGCGGG AAATCAATGC ACGTCCCATC AAGAAGGTGG CTGAGGCTAA 960

GGCTAGAAAG AAAACGAGGA TGCTGAAGAG GCTGGAGCAG ACCAGGAAGA AGGCAGAAGC 1020

CGTGGTGAAC ACAGTGGACA TCTNCAGAAC GAGAGAAAGT GGCACAGCTG CGAAGTCTCT 1080

ACAAGAAGGC TGGGCTTGGC AAGGAGAAAC GCCATGTCAC CTACGTTGTA GCCAAAAAAG 1140

GTGTGGGCCG CAAAGTGCGC CGGCCAGCTG GAGTCAGAGG TCATTTCAAG GTGGTGGACT 1200

CAAGGATGAA GAAGGACCAA AGAGCACAGC AACGTAAGGA ACAAAAGAAA AAACACAAAC 1260

GGAAGTAAGC AGAGCTGCCA GGCTCCCAGG AGAGCATGGG GACTAGGAGG AAGGGTGTGG 1320

CATGGCTCAG TCTGGCCCCC TTGATTACCG GCCTAGCCCC TGCTCACATC ACAGCTGTCT 1380

GAAGAACAGT GAGGTGGAGT GCCTAGAACT CCCGTGGTGG TCCTGAGCAG AGAGGAGGAT 1440

GTCCTCCTGC CTGCCTGAAG GTCTCCCATG AAAACACTGC TGAACTGTGT TGACACTCAT 1500

GACCCTTTTT TTAAACCGTT AAAGGGAAGT TCGGTGTTGG AGCGATACTC AATGTAGTCA 1560

GTCTACACCT GGACGTGTGG GCCACTTAAG CCCTCCCCAC CCCCATCCTA TTCCTRAATA 1620

AAACCAGGAT AATGGAARAA AAAAAAAAAA AAAAAAAAAG GGGGGGCCCN TAAAGGGNCC 1680

CANNTTT 1687

(2) INFORMATION FOR SEQ ID NO: 160:

(i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 1642 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 160:

```
GGATGACAGA TTGCGACANA GATTTGTGAC CCTTCCTGCT GAACTTCAGA GGGAGCTGAA     60
ANCAGCGTAT GATCAAAGAC AAAGGCAGGG CGAGAACAGC ACTCACCAGC AGTCAGCCAG    120
CGCATCTGTG CCCCGAGAAT CCTTTACTTC ATCTAAAGGC AGCAGTGAAA GAAAAGAAAA    180
GAAACAAGAA GAAAAAAACC ATTGGTTCAC CAAAAAGGAT TCAGAGTCCT TTGAATAACA    240
AGCTGCTTAA CAGTCCTGCA AAAACTCTGC CAGGGGCCTG TGGCAGTCCC CAGAAGTTAA    300
TTGATGGGTT TCTAAAACAT GAAGGACCTC CTGCAGAGAA ACCCCTGGAA GAACTCTCTG    360
CTTCTACTTC AGGTGTGCCA GGCCTTTCTA GTTTGCAGTC TGACCCAGCT GGCTGTGTGA    420
GACCTCCAGC ACCCAATCTA GCTGGAGCTG TTGAATTCAA TGATGTGAAG ACCTTGCTCA    480
GAGAATGGAT AACTACAATT TCAGATCCAA TGGAAGAAGA CATTCTCCAA GTTGTGAAAT    540
ACTGTACTGA TCTAATAGAA GAAAAAGATT TGGAAAAACT GGATCTAGTT ATAAAATACA    600
TGAAAAGGCT GATGCAGCAA TCGGTGGAAT CGGTTTGGAA TATGGCATTT GACTTTATTC    660
TTGACAATGT CCAGGTGGTT TTACAACAAA CTTATGGAAG CACATTAAAA GTTACATAAA    720
TATTACCAGA GAGCCTGATG CTCTCTGATA GCTGTGCCAT AAGTGCTTGT GAGGTATTTG    780
CAAAGTGCAT GATAGTAATG CTCGGAGTTT TTATAATTTT AAATTTCTTT TAAAGCAAGT    840
GTTTTGTACA TTTCTTTTCA AAAAGTGCCA AATTTGTCAG TATTGCATGT AAATAATTGT    900
GTTAATTATT TTACTGTAGC ATAGATTCTA TTTACAAAAT GTTTGTTTAT AAAGTTTTAT    960
GGATTTTTAC AGTGAAGTGT TTACAGTTGT TTAATAAAGA ACTGTATGTA TATTTGGTAC   1020
RGGCTCCTTT TKGTGAAYCC TTAAAAACTC AACTCTAGGA RGCAACTACT GTTTATTATA   1080
CTAAARGGCT GAAAAMCCTC CAGGCCAGAC TGCTAAGCTC TGAAATYCCT GAGAGGTCTC   1140
AGACCGGGAT TCTACTTGTT CCAAGAAAGG GTAAAGCTTC TAAACCATCT TATTCTTGTC   1200
TCCAAGCATG AACACAGGAG CATGTYAAGA AAATCTTTAC TACTTTCTYC CATGCGGAGA   1260
AATCTACATA TTTTGAATTA GAAACACCCT CACACCCACT TGAAGATTTT TTTCCTGGGA   1320
ACATTATGTC CCGTAGATCA GAGGTGGTGT TGTCTTTTTG CTTCTACTGG CCATTGAGAA   1380
ACTTTGATGA TAAAAAAGAA CGGTATAGAT TTTTCAAACG TATATAAAAT ATTTTTATGT   1440
TATATGTTAT GCCATAACTT TAAAATAAAA ATAGTTTAAA ATTCTATGCT AGTGGATATT   1500
TGGAACTTTT TCCTCAAACA AACACCCCAC ACTGACTTCA GCAAAACCCT AAAACTAGCT   1560
ACAGATTACT ACTACGAATG AATCATYAAG TTTTGTGTCT GCAACAATTT AGAAGCACTA   1620
AGCCCAAATA TCAGGAAATG TGTGTATGAT GGAATTTTCT AGGACAAAAC AGATCAAGAT   1680
TAAAACAGGA TCAAGGATTA ATGGTATAAA AATGGTCTAC TAAAACAGGA TCAAGGATTA   1740
AAACAGGATC AAGGATTAAT GGTATAAAAA TCTCTACTGG TTACCGGGTG GCNGGGCCAT   1800
```

ACAGGGTAGT CGTGGATGGA TAGTTTAGTT TGGNAAGGGT AA 1842

(2) INFORMATION FOR SEQ ID NO: 161:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 770 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 161:

GGCACGAGCC CTATGCTGTT CTTGTGATAA TGAGTGAGTC TCACAAGATC TGGTGGTGTT 60

ATAGGCATCT GGCATTTCCC CTGCTGACGC TCATTCTCTA TCCTGCCACC CTGGGAAGAA 120

GTGTCTTCTG TCATGATTGT AAGTTTCCTG AGGCCTCCCC AGCTATGTAG AACTGTGAGC 180

CAATTAAACC TCTTTTCTCT ATAAATTATC CAGTCTTATA TATTTCTTCA TAGCAGTGTG 240

AGAACAGATA ATACCGTAAA TTGGTATCAC AGAGAGTGGG GTGTTGCTAT AAACACATCT 300

GAAAATGTTA AAGCAAATTT GGAACTGGGT AACAGGCAAA GGCTGGAACA GTTKGAAGAA 360

CAGTTAAGAA GAAGACAGGA AAATATGAGA AATCTTGAAA CTTCCTAGAG TCTTAAAGGT 420

CTCAGAAGAC ATGAAGATGT GGGAAGCTTT GGAACTTCCT AGAGACTTGT TTGAATGGCT 480

TTGACCAAAA TGCTGATAGT GATATGGACA ATGAAGTCCA GGCTGAGCTT ATCCAGACAG 540

ACATAAGAAG CTCGCTGGGA ACTTGAGTAA AGATCACTCT TGCTAGGCAA AGAGACTGGT 600

GGCCTTTTTT CCTCTGCCCT AGAGATCTGT GGAAATCTGA ACCTGAGAGA GATGATTTAG 660

GGTATCTGGC AGAAGAAATA TCTAAGCGGC AAAACCTTCM AGAGGAAGCA GAGCATAAAC 720

GTTTGAAAAA TTTGCAGCCT GACNATGGGA GACCAAAGTT AAACCCAATT 770

(2) INFORMATION FOR SEQ ID NO: 162:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 519 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 162:

GAATTCGGCA CGAGCTGAGA GGCACAGGAG CAACAGCCAG TGCCCCCTGC AGAGGACCAC 60

TGGGGTCACA GACTTCARAC CTGATGACCT GGGCTCAGAT CCCAGCTCTG CACCTACCAG 120

CCGTGTGACA AGGTGTCCTC TCTGAGCCTC AGTCACACAC TGCCTTAACG GTTGGGCCTC 180

ATGGAGCTGT TTGTGAAGGT TAAATGGGAA GACATAAAGC ACTTAGCCCA GAGCCAAGGA 240

CATGCTGAAT AGGATAATGG TGGCCTCCTT TGGCGCTGTG CTGGTGCAGG TGTGCCGAGG 300

AAYTGGGCAG GGGTGACAGA TACCTCTTCT AACCTAGTTC CTTTCCAAGA ACCTAATTGG 360

TGTCTCTCCC TCCCCCAGGC AATTGGAAGG AGGAGGCTGG GCCCCAGCCC CAGAATACGG 420

GAGGTTTCTC ACCGTGGTAG GGAAATTGCT GGGTTGGGGG TGTGGGCAAC CACAGTGATC 480

GTCTCTCTGC AGGACGGATG AGGCTTTGCT GACAGAGGC 519

(2) INFORMATION FOR SEQ ID NO: 163:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 753 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 163:

GGCACGAGCG GCACGAGCAG CCAGTTGCTG ACTGGCACAT GGCCTCCAGC GTCCCGGCTG 60

GTGGGCACAC TAGAGCCGGA GGGATCTTCT TAATTGGTAA ATTGGATCTT GAAGCTTCAC 120

TGTTTAAATC TTTTCAGTGG CTTCCCTTTG TACTTAGAAA AAAATGCAAC TTCTTCTGCT 180

GGGACTCATC CGCTCACAGC CTTCCCCTCC ACCCTCTCTC TGCCTCATGC TCTGCCCCTG 240

CCTGCCATGC CTCCGATACT CACCTTTTGT ACCCCAGCAC CCGTGCCCTC TGCCCCTCGA 300

TCTTTGCCTG GCTGGTTGCT CCTCACTCAG TGTTCAGGAC AAATGCTCCT GGCCCTACCC 360

CATCTAGCCA GTCTAGCCCG GTCTTCCCTG TCTTCCCTGT TTCATTCATG GCTCTTATTG 420

TTTGTTWACT TGTGTGCTGT TGACTTTTAA CTCTCTCAGT CCCCACTGGA ATGCAAGCGA 480

TCTCCCAAGC TCCTAGAATT GTTCCTGCCT CTTCACAGGC CCTTACGCTG TGTGTGCTCG 540

TGCCGAATTC GGCACGAGGG TATGTGCACT TGCTGGTATG TATGTAGGTG TTTGCTAACA 600

CATACGTGCA CACGCAGAAT GCTTCCAGGG GACTGCACAG CCTCTAGTTC GCAGCCCCCA 660

CCCCTCCCTT TGSCCCTGCA CTCTCCCCTC TCTGAGCTGC ATTCGCATGA AAGGGTGCAN 720

GGTTCCTGAN CCCGCNAGCG NCACCTCCTG GGA 753

(2) INFORMATION FOR SEQ ID NO: 164:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1400 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 164:

```
GGCACAGTTT ATTAATACCT ATTATGGGAA AGTCACTTTG GTTGGCATTG AAAATTACAT     60
CATCTTTAAA GCAGTATTTG TCCCCAGATG GACTCATCAC TAGCAAAGAC TAGGTTCATT    120
GGAAGGCATA GGGTGAGAGA ATGGGAAGAT GRAGTGGAGG CGGGTTGTTA AAGTGCTGTC    180
AGTGAGTGAT TTTGTCTACT TGAATAATGG TCCATGTTTG GGGGCATATT GTGTTTCATA    240
AGAAGTGAAA GGTATTTGCA AAGTAAGCTA CAAATGACCC ATAAATCTGT TAACAACAGT    300
CCTTAATATG CAAAGATGAA AAACAAGCAT TACTGCTACC CAAAGGGAAC TGGTGCTTGG    360
TGATGTGCAG ATGGGGCTGT TGGTTAAGAG AGCTATTACA GGTTTTCTCT CTTAGGTTTC    420
ATAGGAGGTA GTTACTGAGA TGAGATTGTT TTATCTTTTT GAATACAGAT CTCTTGTCTT    480
GAGTTAGTTC TGAGGATGGG AGTAATAAAG GAGTTTTTTG TTTTTTTGTT TGTTTGTTTG    540
TTTTGGCTCC TTAGTAATAC TCCTCTGACA TTTATTTCTA TTATTCTTCA AAGAAAGGAA    600
ACCAACTGAA ATGTTTGCTT TAACAAACAT TTTAATAAGT TCTCTGGGTT TTTTTTTCCC    660
CTTTTAAAAA AATTAGCATA TACCATAGCA ATAAAAGAAC TAATGTTAAC TATTGTATGC    720
TACAACTTAA GTGATTTTTC TAAAGAAGCA CAATGTCATT GRAAGTATTA TTGAAAAGGA    780
TCATAGTCAC ATTGAATTTG TGAAGGCCAA AGAAATTGAA GGGAGTGATA TTTTCATTTT    840
ATGATATTCA CATATTTAGT AAATTTTGTG TACAAGAATA CCAGGCAGAG TGTTTTACCC    900
ATGGAAACAG GTTTCAGATT ACTTTGTTTT TACTGTTAGA GTCTCAAGTT TAGAAATGCT    960
AACACTTAAA TCAGTTTTTT TCTCACTATA CTTGAAGATT GTTAATATTT TGATATCTTC   1020
CTAGCTTGAT GGAATTTAAA CATATCTTCA GATCTGTGAC AGTGACAGCC AATAGGACTG   1080
ATAATATTAG CTTCAAACCA ATAATATCCA GGGTTAAAAT AAAAATCATA GTGAAAGTAC   1140
GATTGTAAAA TTATGCTATA TTAACTTTTA AGTCTGTAAT AACTTGACAT CAAAATGTTA   1200
TGTAATTACC ATAAATAATG GCTAGCGAGA ACATCTTTGG AAATTCTCAA ATTACCTTTC   1260
TTACTACACT GTTTGCAGAA TGAATGTAGA AATGATCCTG TTAGCTTTCT GAATGTTCTG   1320
TGGTTGAATG TGTTTTTGCT TAAATAAAGC TTTTGGTATT TGTTTAAATW ACAAAAAAAA   1380
AAAAAAAAAA AAAAACTCGA                                               1400
```

(2) INFORMATION FOR SEQ ID NO: 165:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 2153 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 165:

```
CAGGCCTCAG GGCCTCTGGT GGCTCTGGCC CAGACAGTAT TTGCAGTTCT TGTGCTATGG     60
GTGGGAGTCT TCTTCCTCAA GTTTCGGCAG CTGTGCTGTG NCTGGATGGG CTGCTCCTCC    120
CAGGGCTCAA GGGCTGTGGT CCGCTCAGGG TCTCATTTCC CCAGGCCAAG TTCAAGGCAG    180
CAGCCCTTTG TGAGGCGCTC TTGGCCCTGG GCTGGAGGGA GAACTTTAAG CTTTTTTGCT    240
CACAGGGACG TGGTATGGGC CCTGGGTGCA GGTGCCCACA TTCTGCTAAT GAGAGCTTTG    300
TCTGATCAGT CCTGGGTCCA TCAGTTTGTC CATGTGTCCG GCTGCCAGCC CGTCCCTTGG    360
GATCCTTCCC CTGGGGTGTA GCCTTGTTCA TTAGTATATA CTCATTCCTT CATGCTTTCC    420
TCAGCAGAAC ACTTGCACTT CTGAGGTGAG CTTTTGCCCC RTGCCCTTCC TCCACAGGTG    480
TTGCCTTTTT ATAAAGACCT GATAGCAGAA TAAATTGGTG TTTCCCTGTT GACCCAGCAC    540
CATTTCTGTG GGCCTAGAAT ATGGCCCTCA ACCCTTAGAG TGGGGCAGTG AGGGCTTGAG    600
GAGTGACCCT TCCTTTCTCA TGGTTTTAGT CATTTTGGCT GCCAGCCCTT AATGGCACAG    660
ATCTGCTGCT TCTAACAGAT GGCCAGGAGG TGACACCGAT TTCAGCCATT GCCAAGGTTA    720
GCACCCTCTC CTTTGAGCCT AGGGCCACAC TGTTCATTGT CACTTTAGGC AAGTGCCTGT    780
TTGGCTTTAA AGGTAAGCCT GCCAGCTGTG AGAAGCCTTG GTAACTGATG GACTCATTTC    840
CTGGTCCTTA AAGATGCAGC CTCTTAAGGG CTCCTTGATG GATGCCATCT CTCCTAGCCC    900
CCAGCCCTGG TGCCACTGGT GGGCAGGTTC CCATTCTTTG GGGCTGGGAG GGACAGCTTG    960
CCTGTTTCTG GTCACAAATT ACAGTCTTCT CTCCTGTACC ATTCTGTGGC TTCAGCATGG   1020
GGGCAGTAGC CTTTCATTAG TGTAGATAGT CATTCCCTGG TAGGGTGGAG GGTAAGACAT   1080
AGGGTCTGGA ACTGTTTGGG ACCTTTTGGG GATGTCCTGT GCCTCCCAGA TTCCTMGATT   1140
CTGGGAGGAG AGGCTGCCGC ATTCTGCTGC TCCTCACAGC GAGCAAAGCT GCACCCACTT   1200
ACATTCAGTA TTTTCCTGGC ACTACAAAGA GTGGGAAGGC CTGGGATTTG CTGCTGCTCC   1260
CTTAGAGCAG GGCCCCTYTT TTCAGCACTT TGGACACCTG GAGACCCAGC CCTGTTATTT   1320
AATGGTAGTG GGCAAGTGTG TGTGCATACT GTCTGCCACT GCTTTCTCCC TGCCCCATGC   1380
CAGAGAGCCC TGTCCCTGCC AGGCCCAGCC TTCTTAGCCC CAACTTGGGA ACAAAGTGCA   1440
ACATGGGATC ATGGGTTGGG GTGCTCAGGT GAGCCCTCTC TATAGTGCTT CCCTGGGCCA   1500
AGCTGACACC AGCCCCTGAG GGTGGGGTGG GACGGGTGGT GCTTAAAAGA GGAAGGGGAC   1560
CAGTGTAGCA ACTTGCCAGG GACCCCACCC CTCCCTCTCT GGGCCTGTGC AGTGAGCATG   1620
GGGATTCCCA TCAAGGGGCC TGGCACCTGT GCTAGTTACG TAGCCGCTGN TCACGCGCTC   1680
```

ACTCCTGACC ACATGCACGT TCCCTAGATG CAGACTGCTT TGAACTTTAA AGCTGTACAA 1740

TTTGGTTATG TTTGTGCTGA CTTAAAATAT ATTTTAATGA GGAAAAAATA ATGGAGAACC 1800

CTGGGAAGGA CCTGGTTCTT TTGCTTCTCG GGGAACTGTA AGCCCTCGCG TTCTGGGAAT 1860

CGCTCTCTGC TGCTCTTTCC TGGAAGCTAA GCCTGTCTCC ACCGCCCGAG GCCTGCGCCG 1920

GTGCTCCCGC CGCAGTTGCG TTTGCTTTGG ACCTTGCGTG CGGGGGAGGG GGTGCTCGGT 1980

CCGAGCCCGC TCCTTTCTGT ACACCTAGCG CTGCCCGCCC CGCTTGTGTC TGAGGTCGTG 2040

TATGTCAAAA ATAAAGCCGC TAGAAACGGA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA 2100

AAACTCGAGG GGGGGCCCGT ACCCAATTAA CCCNNTATGA TCTATAAAGC GTC 2153

(2) INFORMATION FOR SEQ ID NO: 166:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1251 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 166:

GCCCACGCGT CCGCCCACGC GTCCGGCGGT GCGGAGTATG GGGCGCTGAT GGCCATGGAG 60

GGCTACTGGC GCTTCCTGGC GCTGCTGGGG TCGGCACTGC TCGTCGGCTT CCTGTCGGTG 120

ATCTTCGCCC TCGTCTGGGT CCTCCACTAC CGAGAGGGGC TTGGCTGGGA TGGGAGCGCA 180

CTAGAGTTTA ACTGGCACCC AGTGCTCATG GTCACCGGCT TCGTCTTCAT CCAGGGCATC 240

GCCATCATCG TCTACAGACT GCCGTGGACC TGGAAATGCA GCAAGCTCCT GATGAAATCC 300

ATCCATGCAG GGTTAAATGC AGTTGCTGCC ATTCTTGCAA TTATCTCTGT GGTGGCCGTG 360

TTTGAGAACC ACAATGTTAA CAATATAGCC AATATGTACA GTCTGCACAG CTGGGTTGGA 420

CTGATAGCTG TCATATGCTA TTTGTTACAG CTTCTTTCAG GTTTTTCAGT CTTTCTGCTT 480

CCATGGGCTC CGCTTTCTCT CCGAGCATTT CTCATGCCCA TACATGTTTA TTCTGGAATT 540

GTCATCTTTG GAACAGTGAT TGCAACAGCA CTTATGGGAT TGACAGAGAA ACTGATTTTT 600

TCCCTGAGAG ATCCTGCATA CAGTACATTC CCGCCAGAAG GTGTTTTCGT AAATACGCTT 660

GGCCTTCTGA TCCTGGTGTT CGGGGCCCTC ATTTTTTGGA TAGTCACCAG ACCGCAATGG 720

AAACGTCCTA AGGAGCCAAA TTCTACCATT CTTCATCCAA ATGGAGGCAC TGAACAGGGA 780

GCAAGAGGTT CCATGCCAGC CTACTCTGGC AACAACATGG ACAAATCAGA TTCAGAGTTA 840

AACAGTGAAG TAGCAGCAAG GAAAAGAAAC TTAGCTCTGG ATGAGGCTGG GCAGAGATCT 900

```
ACCATGTAAA ATGTTGTAGA GATAGAGCCA TATAACGTCA CGTTTCAAAA CTAGCTCTAC    960
AGTTTTGCTT CTCCTATTAG CCATATGATA ATTGGCTAT GTAGTATCAA TATTTACTTT    1020
AATCACAAAG GATGGTTTCT TGAAATAATT TGTATTGATT GAGGCCTATG AACTGACCTG    1080
AATTGGAAAG GATGTGATTA ATATAAATAA TAGCAGATAT AAATTGTGGT TATGTTACCT    1140
TTATCTTGTT GAGGACCACA ACATTAGCAC GGTGCCTTGT GCAKAATAGA TACTCAATAT    1200
GTGAATATGT GTCTACTAGT AGTTAATTGG ATAAACTGGC AGCATCCCTG A             1251
```

(2) INFORMATION FOR SEQ ID NO: 167:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 882 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLCGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 167:

```
GACSMTCTAG AACTATGGTC CCCCGGGACT GCAGGAATTC GGCACAGCGG CTGCGGGCGC     60
GAGGTGAGGG GCGCGAGGTT CCCAGCAGGA TGCCCCGGCT CTGCAGGAAG CTGAAGTGAG    120
AGGCCCGGAG AGGGCCCAGC CCGCCCGGGG CAGGATGACC AAGGCCCGGC TGTTCCGGCT    180
GTGGCTGGTG CTGGGGTCGG TGTTCATGAT CCTGCTGATC ATCGTGTACT GGGACAGCGC    240
AGGCGCCGCG CACTTCTACT TGCACACGTC CTTCTCTAGG CCGCACACGG GGCCGCCGCT    300
GCCCACGCCC GGGCCGGACA GGGACAGGGA GCTCACGGCC GAYTCCGATG TCGACGAKTT    360
TCTGGACAAK TTTCTCAGTG CTGGCGTGAA GCAGAGTGAC YTTCCCAGAA AGGAGACGGA    420
GCAGCCGCCT GCGCCGGGGA GCATGGAGGA GAGCGTGAGA RGCTACGACT GGTCCCCGCG    480
CGAMGCCCGG CGCACCCAGA CCAGGGCCGG CAGCARGCGG ANCGGAGGAR CGTGCTGCGG    540
GGCTTCTGCG CCAAYTCCAG CCTGGCCTTC CCCACCAAGG AGCGCGCATT CRACGACATC    600
CCCAACTCGG AGCTGAGCCA CCTGATCGTG GACGACCGGC ACGGGGCCAT CTACTGCTAC    660
GTGCCCAAGG TGGCCTGCAC CAACTGGAAG CGCGTRATGA TCGTGCTGAG CGGAAGCTGT    720
GCACCGCGTG CGCCTACCGC GACCCGYTGC GNTCCCGCGC GAGCACGTGC ACAACGCCAG    780
CGCGCACTGA CTTCAACAAT TCTGGCGCCG CTACGGGAAG TCTCCCCCAC CTCATGAAGT    840
CAAGCTCAAG AATACACCAA TTCTTTCTGC GCGACCCTTC TG                       882
```

(2) INFORMATION FOR SEQ ID NO: 168:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1208 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 168:

```
GGGAAACTCA AAAGGATGAT GGAATGGTTG ATGGAGCCAG AGCCTAGAAG TRAAGGGATA     60
CAGAGTGAAG ATAGAGGTAT TTACGTATAT TTWAATATTA GCTTTGGAAT TACGTAGGGA    120
TTCTTAAGAA AAGATCATGA CAGGACAGCC ACATTTGGTA AAATGTCAGG GCAGCCAGTG    180
CATGGTCCTC CTGGGGCTCC TCAGTTGACG GGTTTAAATC ATTTCCTGAT CCCCCTGCCC    240
TGGTTTGAGG AATGCATACA GTACGTGAAA TGCCTGTGGT ATGAGTTGCA ATGGGCAATC    300
AACCTGGGTA AATCCAAGAT TAATGATTAG TTCTAAAGAT CCAGTTGAAG TTCTAGAGTG    360
GGAATTTTCC GTCAAGCARC TCAGCACAGC TTTATGCCTG TTCCTCTAAT AACGATAGGT    420
AACAAATAGC TGTGTKTWCA CAGCTAGGAR GATAACCAAA TCTAGAGTTC TTGARTCTCA    480
TTTAATAAAT AAKTATTATG AGTACCAACT GCATATTTCA GGCACTGCAT TTGACTCTGT    540
TAAATACTGA TYCCTTAKGA CMSCCACWTC AGAWAACMTT AATCTGTCTG ATCAATAAAC    600
AGCTTGACTT AGAGRGGTAA AATAGCTTGC CACAGGTWAC CCAATTAGTA GGTAACAGCG    660
ACAGAATAAC AGTGCAGTTA AAATCTTAGA CTGGAGACTA ATTGCATAAG TTTGAATTTC    720
AGTTCTGCTA TGTAAATTTG GGTGAGTACC TTAATTYACC TGAGTCTCGG TCTTTATATC    780
TGTAGAATGG AGCTAATGAT ATTACTTAAT TTGCTTTATG TGAGATTAAA TGTACTAATA    840
TATGTAAATC ACTTACAACA GCATTTGACA TATTTGACAT ACTTAATATA TTTGCTACTA    900
ATACTATTAG CAACAGCATT CTGATTTTCC AAGTTGAAAT TCAGTGTTTT CTTTTTTACT    960
TTGCCATAAT TTACAATGTT GTGCTCTGTA AACCATAAAT TTCCCTGAGG TGTTGTCAGG   1020
TTAAAAAAAA ATCACTATGG CCCCCARNMA CTTGGAAAAT AGAAATGAGA CCAGCTTCAT   1080
CTATATTCTT TACTGCAAAT AACTTAGAAT TGTAATAGGC TAATATGTAC TGGGACTTCC   1140
AATTTGGGAA TATGACAAAA ATAATACTAT TTAGCTAAAA CATATACAGA ACTTATTTTT   1200
CCTCTGAA                                                             1208
```

(2) INFORMATION FOR SEQ ID NO: 169:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1307 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 169:

```
GGCACGAGAG AAAAGAGGTT GAGAATGTTT TCTAGCAGGC AGAATGTGCA TACATGTTTT      60
CATGARTGTC CTTTGGGTGC TGTTTCTTTT AAATCCTCTG TGCACAGGGC TCTGGCCTTT     120
ARTAAACTGT TTTTCTGTCT TACGTCATGC TGACTGGGTG CTAGGGGCTG ATTACAAAGG     180
GGAAGAGTTG AACAGACATC AGGGGCCGAT GAAACCAAAG GACTAGGAGT CAGGAGAACA     240
AGTCAGGGAT TAGGAGACAG CGGTTTGGTT TATTGTTATC CAGCTGGAGG ACTCCTAGGG     300
GCAGCAGCAG GAGGAATACC AGGGCCACGG AGGGGCAGGA GTCTCACAGT GGAGGGCAGA     360
CTCTAACAGA TGCCAGCTGA ACGCTCGCTG GCCCTGGATG TCATACGAGT TGGGGACCAG     420
AAATCTGGGC TCAGAGAACC CGTCCAGGGA GATTTGAAGC CATGGGTTAT CTTCTAGAGT     480
TGATACTGAT AATATATTTT AATTTTTATT GATGTTTAAT ACCTTCTGAA ACAGGAGGGT     540
AAGATCAGAT GGGAAGCCCY TCTGTTGAAG GATCTTGGGA ACCTTGGTGG TTTTTTTTTT     600
TTGGTTTTTT TTTTTTTGAT CGAGCTGTGG ACATCCTTCT TAATTCGATT NTGAGGATTT     660
GTTTAACTAA AAAGTTCCCA AACACAGAAA GGGCCTCCCC ACCTGCTTTG GGGAGCTGTC     720
TGTSCTGGGA GTGCCAGGCA TCCSATGGGA CCCATCACTG CCAGTGTCTG TGCCTCCCAG     780
AGGTCAGCCC TGTGTCTGCC CTGGCTCTGT CTCCTCTGTG ACAGGGCAGA GCATTTCTGG     840
TCAGTTTCTC CATGGTGCCT CCCACCCCTT TGTAAAGTGG ATGGACATGA TGGAATTCAG     900
TTGTCTCACC CTGATAGCCT GGGTGTTGAT ATTCACTTTA CCCGCACTCA GACACAGGCG     960
ACCTTGAAGC AGTTCTCGGT GTGTAGAGTC CACGTGACAG TCCCCACAGC CTCCCCAGAT    1020
AGCTGTGTGC CTGTGCGCTA CTGCTGTGCC ATTTTCCCAA CTTNGGCGTT TCACTAAATG    1080
CAGCTGATCT CTCTCTCTGT GCACTCGTGA TCCATGTTGA ACAATACATG TAGGTTCTTT    1140
TTCCACGCAA TGTAAGAACA TGATATACTG TACGTTGGAA AGCATTTACC TTATTTATAT    1200
ACCTGAATGT TCCTACTACA CAAATAAACA TATATTAAAT WCTAAAAAAA AAAAAAAAAA    1260
CTGGAGGGGG GGCCCGGTAC CCAAATCGCC GGATAGTGAT CGTAAAC                  1307
```

(2) INFORMATION FOR SEQ ID NO: 170:

(i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 1624 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 170:

GGCACGAGGT CGCCGCCGCG GCCGCCTGGA ATTGTGGGAG TTGTGTCTGC CACTCGGCTG 60
CCGGAGGCGA AGGTCCCTGA CTATGGCTCC CCAGAGCCTG CCTTCATCTA GGATGGCTCC 120
TCTGGGCATG CTGCTTGGGC TGCTGATGGC CGCCTGCTTC ACGTTCTGCC TCAGTCATCA 180
GAACCTGAAG GAGTTTGCCC TGACCAACCC AGAGAAGAGC AGCACCAAAG AAACRGAGAG 240
AAAAGAAACC AAAGCCGAGG AGGAGCTGGA TGCCGAAGTC CTGGAGGTGT TCCACCCGAC 300
GCATGAGTGG CAGGCCCTTC AGCCAGGGCA GGCTGTCCCT GCAGGATCCC ACGTACGGCT 360
GAATCTTCAG ACTGGGGAAA GAGAGGCAAA ACTCCAATAT GAGGACAAGT TCCGAAATAA 420
TTTGAAAGGC AAAAGGCTGG ATATCAACAC CAACACCTAC ACATCTCAGG ATCTCAAGAG 480
TGCACTGGCA AAATTCAAGG AGGGGGCAGA GATGGAGAGT TCAAAGGAAG ACAAGGCAAG 540
GCAGGCTGAG GTAAAGCGGC TCTTCCGCCC CATTGAGGAA CTGAAGAAAG ACTTTGATGA 600
GCTGAATGTT GTCATTGAGA CTGACATGCA GATCATGGTA CGGCTGATCA ACAAGTTCAA 660
TAGTTCCAGC TCCAGTTTGG AAGAGAAGAT TGCTGCGCTC TTTGATCTTG AATATTATGT 720
CCATCAGATG GACAATGCGC AGGACCTGCT TTCCTTTGGT GGTCTTCAAG TGGTGATCAA 780
TGGGCTGAAC AGCACAGAGC CCCTCGTGAA GGAGTATGCT GCGTTTGTGC TGGGCGCTGC 840
CTTTTCCAGC AACCCCAAGG TCCAGGTGGA GGCCATCGAA GGGGGAGCCC TGCAGAAGCT 900
GCTGGTCATC CTGGCCACGG AGCAGCCGCT CACTGCAAAG AAGAAGGTCC TGTTTGCACT 960
GTGCTCCCTG CTGCGCCACT TCCCCTATGC CCAGCGGCAG TTCCTGAAGC TCGGGGGGCT 1020
GCAGGTCCTG AGGACCCTGG TGCAGGAGAA GGGCACGGAG GTGCTCGCCG TGCGCGTGGT 1080
CACACTGCTC TACGACCTGG TCACGGAGAA GATGTTCGCC GAGGAGGAGG CTGAGCTGAC 1140
CCAGGAGATG TCCCCAGAGA AGCTGCAGCA GTATCGCCAG GTACACCTCC TGCCAGGCCT 1200
GTGGGAACAG GGCTGGTGCG AGATCACGGC CCACCTCCTG GCGCTGCCCG AGCATGATGC 1260
CCGTGAGAAG GTGCTGCAGA CACTGGGCGT CCTCCTGACC ACCTGCCGGG ACCGCTACCG 1320
TCAGGACCCC CAGCTCGGCA GGACACTGGC CAGCCTGCAG GCTGAGTACC AGGTGCTGGC 1380
CAGCCTGGAG CTGCAGGATG GTGAGGACGA GGGCTACTTC CAGGAGCTGC TGGGCTCTGT 1440
CAACAGCTTG CTGAAGGAGC TGAGATGAGG CCCCACACCA GGACTGGACT GGGATGCCGC 1500
TAGTGAGGCT GAGGGGTGCC AGCGTGGGTG GGCTTCTCAG GCAGGAGGAC ATCTTGGCAG 1560
TGCTGGCTTG GCCATTAAAT GGAAACCTGA AGGCCAAAAA AAAAAAAAAA AAAAAAAAAA 1620
AAAA 1624

(2) INFORMATION FOR SEQ ID NO: 171:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2003 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 171:

```
GGCACGAGCC AGCTTGCAGG AGGAATCGGT GAGGTCCTGT CCTGAGGCTG CTGTCCGGGG     60
CCGGTGGCTG CCCTCAAGGT CCCTTCCCTA GCTGCTGCGG TTGCCATTGC TTCTTGCCTG    120
TTCTGGCATC AGGCACCTGG ATTGAGTTGC ACAGCTTTGC TTTATCCGGG CTTGTGTGCA    180
GGGCCCGGCT GGGCTCCCCA TCTGCACATC CTGAGGACAG AAAAAGCTGG GTCTTGCTGT    240
GCCCTCCCAG GCTTAGTGTT CCCTCCCTCA AAGACTGACA GCCATCGTTC TGCACGGGGC    300
TTTCTGCATG TGACGCCAGC TAAGCATAGT AAGAAGTCCA GCCTAGGAAG GGAAGGATTT    360
TGGAGGTAGG TGGCTTTGGT GACACACTCA CTTCTTTCTC AGCCTCCAGG ACACTATGGC    420
CTGTTTTAAG AGACATCTTA TTTTTCTAAA GGTGAATTCT CAGATGATAG GTGAACCTGA    480
GTTGCAGATA TACCAACTTC TGCTTGTATT TCTTAAATGA CAAAGATTAC CTAGCTAAGA    540
AACTTCCTAG GGAACTAGGG AACCTATGTG TTCCCTCAGT GTGGTTTCCT GAAGCCAGTG    600
ATATGGGGGT TAGGATAGGA AGAACTTTCT CGGTAATGAT AAGGAGAATC TCTTGTTTCC    660
TCCCACCTGT GTTGTAAAGA TAAACTGACG ATATACAGGC ACATTATGTA AACATACACA    720
CGCAATGAAA CCGAAGCTTG GCGGCCTGGG CGTGGTCTTG CAAAATGCTT CCAAAGCCAC    780
CTTAGCCTGT TCTATTCAGC GGCAACCCCA AAGCACCTGT TAAGACTCCT GACCCCCAAG    840
TGGCATGCAG CCCCCATGCC CACCGGGACC TGGTCAGCAC AGATCTTGAT GACTTCCCTT    900
TCTAGGGCAG ACTGGGAGGG TATCCAGGAA TCGGCCCCTG CCCCACGGGC GTTTTCATGC    960
TGTACAGTGA CCTAAAGTTG GTAAGATGTC ATAATGGACC AGTCCATGTG ATTTCAGTAT   1020
ATACAACTCC ACCAGACCCC TCCAACCCAT ATAACACCCC ACCCCTGTTC GCTTCCTGTA   1080
TGGTGATATC ATATGTAACA TTTACTCCTG TTTCTGCTGA TTGTTTTTTT AATGTTTTGG   1140
TTTGTTTTTG ACATCAGCTG TAATCATTCC TGTGCTGTGT TTTTTATTAC CCTTGGTAGG   1200
TATTAGACTT GCACTTTTTT AAAAAAAGGT TTCTGCATCG TGGAAGCATT TGACCCAGAG   1260
TGGAACGCGT GGCCTATGCA GGTGGATTCC TTCAGGTCTT TCCTTTGGTT CTTTGAGCAT   1320
CTTTGCTTTC ATTCGTCTCC CGTCTTTGGT TCTCCAGTTC AAATTATTGC AAAGTAAAGG   1380
ATCTTTGAGT AGGTTCGGTC TGAAAGGTGT GGCCTTTATA TTTGATCCAC ACACGTTGGT   1440
CTTTTAACCG TGCTGAGCAG AAAACAAAAC AGGTTAAGAA GAGCCGGGTG GCAGCTGACA   1500
GAGGAAGCCG CTCAAATACC TTCACAATAA ATAGTGGCAA TATATATATA GTTTAAGAAG   1560
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GCTCTCCATT TGGCATCGTT TAATTTATAT GTTATGTTCT AAGCACAGCT CTCTTCTCCT 1620

ATTTTCATCC TGCAAGCAAC TCAAAATATT TAAAATAAAG TTTACATTGT AGTTATTTTC 1680

AAATCTTTGC TTGATAAGTA TTAAGAAATA TTGGACTTGC TGCCGTAATT TAAAGCTCTG 1740

TTGATTTTGT TTCCGTTTGG ATTTTTGGGG GAGGGGAGCA CTGTGTTTAT GCTGGAATAT 1800

GAAGTCTGAG ACCTTCCGGT GCTGGGAACA CACAAGAGTT GTTGAAAGTT GACAAGCAGA 1860

CTGCGCATGT CTCTGATGCT TTGTATCATT CTTGAGCAAT CGCTCGGTCC GTGGACAATA 1920

AACAGTATTA TCAAAGAGAA AAAAAAAAAA AAAAAACTCG NGGGGGGGCC CGGTACCCAA 1980

TTCGCCCTAT AGTGAGCCNA TTC 2003

(2) INFORMATION FOR SEQ ID NO: 172:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 786 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 172:

GGCACAGCGG CACGAGAAGA CTTTGGTGTT TAAGAGATTA ATGTGTTAGC CAGAACAACT 60

CATTTCTCTA CCMGTGTGTA GTCCATTTAT CTTTAAAGAT TTTCTATTGG AATAATTTTG 120

AAATTACTTT CTTAGTTTTC TTCATTAAAA ACTAAGAAAA TGCTTTGTTT ATTATGAATT 180

GCTATTTCTC TTGATTATTA TTCTTGGAGA AAGTCTATCA GACGTAATTC TTCTGATTTG 240

CTTCTAGGCT AGAGGAAAAT GTGAAAGATG ACAAATGAAA ATTTCAAAGG TTGTCAGTAG 300

TATGACTTCT TTTATCGTTT GTCATTATCA CAAATATATC AACATAGGAC TTTTAAAAGA 360

TATTTTGTAC ATATTGGGCC TTAGTAGGAT TTTGCATGAA TTTTTTTTTT CTTTTATGCC 420

CAGAGAGAAA GAGCAAAGAA ATAACCAAGG GTGATGTACT CGTATTGAAG GTTTACCAAA 480

TAAGGACTGC TTTTATTATG AACTATAGTC TATATTCTAA GTAAATCAAT TTTTCTATTA 540

TGTGTTTTTT GTTCCTGCAG GCAAGATCTC TGAACTTTAT GCAGAGGGTT CTTTTAAAAA 600

AACAAAGTTG AATTTTTTTA TTTCTTGGAA TATTTTTTTT CATTGATTTC TCCCAAGTAG 660

AGCAGATTCA AATCTCCTTT GTACCCTATG TCTTTTTTGT TTTGCTATTA GCTCAGTATT 720

CCGTTTCTAC ATTTTCCTTT CCTAGAACCA GTCAATAAAT GACAAAAAAA AAAAAAAAAA 780

ACTCGA 786

(2) INFORMATION FOR SEQ ID NO: 173:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1758 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 173:

```
GGGACGAGCC CTGCCCACCT CCTGCAGCCT CCTGCGCCCC GCCGAGCTGG CGGATGGAGC 60
TGCGCACGGG GAGCGTGGGC AGCCAGGCGG TGGCGCGGAG GATGGATGGG GACAGCCGAG 120
ATGGCGGCGG CGGCAAGGAC GCCACCGGGT CGGAGGACTA CGAGAACCTG CCGACTAGCG 180
CCTCCGTGTC CACCCACATG ACAGCAGGAG CGATGGCCGG GATCCTGGAG CACTCGGTCA 240
TGTACCCGGT GGACTCGGTG AAGACACGAA TGCAGAGTTT GAGTCCAGAT CCCAAAGCCC 300
AGTACACAAG TATCTACGGA GCCCTCAAGA AAATCATGCG GACCGAAGCT TCTGGAGGCC 360
CTTGCGAGGC GTCAACGTCA TGATCATGGG TGCAGGGCCR GCCCATGCCA TGTATTTTGC 420
CTGCTATGAA AACATGAAAA GGACTTTAAA TGACGTTTTC CACCACCAAG GAAACAGCCA 480
CCTAGCCAAC GGTATTTTGA AAGCGTTTGT CTGGAGTTAG AAAGTTCTCT TCTTCAACAC 540
GTCCCTCCCC AGGGTGTTCC TCCCTGTGAC CCAGCCGCCT CGACTTCGGC CCGCTTGCTC 600
ACGAATAAAG AACTCAGAGT TGTGTGTGCA ATGCACACCC AGACACACGC ACGCACACAC 660
ACGCGCGCGC ACACACATGC TTTTTTCTGT TCCCCTCCGC TTTCTGAAGC CTGGGGAGAA 720
ATCAGTGACA GAGGTGTTTT GGTTTTATTG TTATGTGGGT TTTCTTTTGT ATTTTTTTTG 780
TTTGTTTTGT TTTTAAACAT TCAAAAGCAA TTAATGATCA GACATAGGAG AAACCCTGAA 840
TAGAAACAAA ACTTTTGAAT GCTGGATTCA AAAAAAAAAA AAAGTTATCT GGACAGCTTC 900
TTTGAGACTA TTTAAAAACT GGTACAACAG GTCTCTACAA CGCCAAGATC TAACTAAGCT 960
TTAAAAGGTC AAGAAGTTTT ATGGCTGACA AAGGACTCGC GCAACGCAGA AGGCCTTTCC 1020
CACCTTAAGC TTCCGGGGAT CTGGGAATTT TACCCCCATT CTCTTCTGTT TGTCTGAGTC 1080
TCATCTCTCT GCAAGCAAGG GCTGAAATCA TTTTGTTTGG TTGTTTTGAG GGAGAGAGGC 1140
GGGGTGGGGG GGTGCAAATC TGCCAGCAGC TCTTACGTAA GGCATGTTTT ATTGGGGAGG 1200
GCTGAGCTTT TATTTTCTCC TCTCCAGTGG GGTTGGCTTT TATTGTTTCT TGTTTGGGTT 1260
TGGAATGGAA ATATGGATAG CAGCATAAAG TACTTTTATT TTGACAAAAT TCATTTTTTT 1320
CAACAATGGA GACATAGATT TGACCCACAA TAACTTCTCC CCCTCTCTTT TTACTCTGCT 1380
CAAAAAGCAT CTCTCCTCCC ATTACCCAAC CTTGGTCATA AGTGTGCCTG GCTGGTTTGC 1440
AGATATTTGT TCTGCTTTGT AAAAATTGGC CATTAGTGCA TTTATTGAGA TGATCTCTAA 1500
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AGAGCTATGC CCTGACCTAC CCCTGATTCT ATGACATTGG GGCCCTTCTT TTGCTGAAAC 1560

TGCCTTACGT AATGGTTTTA CTCCTTGAAA GAGATTTGAC GGAATCCATT TTATGCCAAG 1620

TGCTGCCCTG CACTGTTTCT GCAATATGTG GTGTATGCTG TGGTGATCTT GCTGGGAATG 1680

ATTATAAGTG TGTGTGTGGT GGGGGAGTGG GTATTACATG CATTGCTGAA GAGTCAAAAA 1740

AAAAAAAAAA AAACTCGA 1758

(2) INFORMATION FOR SEQ ID NO: 174:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 888 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 174:

CTGTTAGAAT GCCCAGTTTA CCTGGATGGC AACCCAACAG TGCTCCTGCC CACCTGCCCC 60

TCAATCCTCC TAGAATTCAG CCCCCAATTG CCCAGTTACC AATAAAAACT TGTACACCAG 120

CCCCAGGGAC AGTCTCAAAT GCAAATCCAC AGAGTGASMC ACCACCTCGG GTAGAATTTG 180

ATGACAACAA TCCCTTTAGT GAAAGTTTTC AAGAACGGGA ACGTAAGGAA CGTTTACGAG 240

AACAGCAAGA GAGACAACGG ATCCAACTCA TGCAGGAGGT AGATAGACAA AGAGCTTTGC 300

AGCAGAGGAT GGAAATGGAG CAGCATGGTA TGGTGGGCTC TGAGATAAGT AGTAGTAGGA 360

CATCTGTGTC CCAGATTCCC TTCTACAGTT CCGACTTACC TTGTGATTTT ATGCAACCTC 420

TAGGACCCCT TCAGCAGTCT CCACAACACC AACAGCAAAT GGGGCAGGTT TTACAGCAGC 480

AGAATATACA ACAAGGATCA ATTAATTCAC CCTCCACCCA AACTTTCATG CAGACTAATG 540

AGCGAGGCAG GTAGGCCCTC CTTCATTTGT TCCTGATTCA CCATCAATCC CTGTTGGAAG 600

CCCAAATTTT TCTTCTGTGA AGCAGGGACA TGGAAATCTT TCTGGGACCA GCTTCCAGCA 660

GTCCCCAGTG AGGCCTTCTT TTACACCTGC TTTACCAGCA GCACCTCCAG TAGCTAATAG 720

CAGTCTCCCA TGTGGCCAAG ATTCTACTAT AACCCATGGA CACAGTTATC CGGGATCAAC 780

CCAATCGCTC ATTCAGTTGT ATTCTGATAT AATCCCAGAG GAAAAAGGGN AAAAAAAARA 840

AMAARAAARA ARAAAGGAGA TGATGATGCA GAATTCCACC AAGGCTCC 888

(2) INFORMATION FOR SEQ ID NO: 175:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 2379 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 175:

```
GGCAGAGCTA GTGTGGACTC CATCCCCCTG GAGTGGGATC ACGNCTATGA CCTCAGTCGG     60
GACCTGGAGT CTGCAATGTC CAGAGCTCTG CCCTCTGAGG ATGAAGAACG TCAGGATGAC    120
AAAGATTTCT ACCTCCGGGG AGCTGTTGSC TTATCAGGGG ACCACAGTGC CCTAGAGTCA    180
CAGATCCGAC AACTGGGCAA AGCCTGGATG ATAGCCGCTT TCAGATACAG CAAACCGAAA    240
ATATCATTCG CAGCAAAACT CCCACGGGGC CGGAGCTAGA CACCAGCTAC AAAGGCTACA    300
TGAAACTGCT GGGCGAATGC AGTAGCAGTA TAGACTCCGT GAAGAGACTG GAGCACAAAC    360
TGAAGGAGGA AGAGGAGAGC CTTCCTGGCT TTGTTAACCT GCATAGTACC GAAACCCAAA    420
CGGCTGGTGT GATTGACCGA TGGGAGCTTC TCCAGGCCCA GGCATTGAGC AAGGAGTTGA    480
GGATGAAGCA GAACCTCCAG AAGTGGCAGC AGTTTAACTC AGACTTGAAC AGCATCTGGG    540
CCTGGCTGGG GGACACGGAG GAGGAGTTGG AACAGCTCCA GCGTCTGGAA CTCAGCACTG    600
ACATCCAGAC CATCGAGCTC CAGATCAAAA AGCTCAAGGA GCTCCAGAAA GCTGTGGACC    660
ACCGCAAAGC CATCATCCTC TCCATCAATC TCTGCAGCCC TGAGTTCACC CAGGCTGACA    720
GCAAGGAGAG CCGGGACCTG CAGGATCGCT TGTSGCAGAT GAATGGGCGC TGGGACCGAG    780
TGTGCTCTCT GCTGGAGGAG TGGCGGGGCC TGCTGCAGGA TGCCCTGATG CAGTGCCAGG    840
GTTTCCATGA AATGAGCCAT GGTTTGCTTC TTATGCTGGA GAACATTGAC AGAAGGAAAA    900
ATGAAATTGT CCCTATTGAT TCTAACCTTG ATGCAGAGAT ACTTCAGGAC CATCACAAAC    960
AGCTTATGCA AATAAAGCAT GAGCTGTTGG AATCCCAACT CAGAGTAGCC TCTTTGCAAG   1020
ACATGTCTTG CCAACTACTG GTGAATGCTG AAGGAACAGA CTGTTTAGAA GCCAAAGAAA   1080
AAGTCCATGT TATTGGAAAT CGGCTCAAAC TTCTCTTGAA GGAGGTCAGT CGTCATATCA   1140
AGGAACTGGA GAAGTTATTA GACGTGTCAA GTAGTCAGCA GGATTTGTCT TCCTGGTCTT   1200
CTGCTGATGA ACTGGACACC TCAGGGTCTG TGAGTCCCAY ATCAGGAAGG AGCACCCCAA   1260
ACAGACAGAA AACGCCACGA GGCAAGTGTA GTCTCTCACA GCCTGGACCC TCTGTCAGCA   1320
GTCCACATAG CAGGTCCACA AAAGGTGGCT CCGATTCCTC CCTTTCTGAG CCARGGCCAG   1380
GTCGGTCCGG CCGCGGCTTC CTGTTCAGAG TCCTCCGAGC AGCTCTTCCC CTTCAGCTTC   1440
TCCTGCTCCT CCTCATCGGG CTTGCCTGCC TTGTACCAAT GTCAGAGGAA GACTACAGCT   1500
GTGCCCTCTC CAACAACTTT GCCCGGTCAT TCCACCCCAT GCTCAGATAC ACGAATGGCC   1560
CTCCTCCACT CTGAACTAAG CAGATGCCAT CTGCAGAAGT GCTGGTAGCA TAAGGAGGAT   1620
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CGGGTCATAA GCAATCCCAA ACTACCAACA AGAGGACCTT GATCTTGGCG AAAGCCMTCG 1680

GTGTGGCAGC TTTAGCCTCC TCCAGATCAC ATGTGTGCAA ATTATGGCTT CAGAGGTGGA 1740

AGATAAACAG TGACGGGGGA ACAAACAGAC AACAAGAAGG TTTGGAAGAA ATCTGGTTTG 1800

AGACTCTGAA CCTTAGCACT AAGGAGATTG AGTAAGGACC TCCAAAGTTC CCCGGACTCA 1860

TGAATTCTGG GCCCTTGGCC NATTCTGTGC ACAGCCAAGG ACTTCAGTAG ACCATCTGGG 1920

CAGCTTTCCC ATGGTGCTGC TCCAACCATC AGATAAATGA CCCTCCCAAG CACCATGTCA 1980

GTGTCGTACA ATCTACCAAC CAACCAGTGC TGAAGAGATT TTAGAACCTT GTAACATACA 2040

ATTTTTAAGA GCTTATATGG CAGCTTCCTT TTTACCTTGT TTTCCTTTGG GGCATGATGT 2100

TTTAACCTTT GCTTTAGAAG CACAAGCTGT AAATCTAAAA GGCACTTTTT TTTAGAGGTA 2160

TAAAGAAAAA CTAGATGTAA TAAATAAGAT CATGGAAGGC TTTATGTGAA AAAGTTGAA 2220

TGTTATAGTA AAAAAAAAG ATATTTATGT ATGTACAGTT TGCTAAAGCC AAGTTTTGTT 2280

TGTATTGATT TCTTTGCATT TATTATAGAT ATTATAAAAT AAAAAAAAA AAAAAAAAAC 2340

TCGAGGGGGG GCCCGGTACC CAATTCGCCC TATAGTGAG 2379

(2) INFORMATION FOR SEQ ID NO: 176:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1348 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 176:

GCGCCTTCAC GATGCCGGCG GTCAGTGGTC CAGGTCCCTT ATTCTGCCTT CTCCTCCTGC 60

TCCTGGACCC CCACAGCCCT GAGACGGGGT GTCCTCCTCT ACGCAGGTTT GAGTACAAGC 120

TCAGCTTCAA AGGCCCAAGG CTGGCATTGC CTGGGGCTGG AATACCCTTC TGGAGCCATC 180

ATGGAGGTGA GGGGCAGGGG TGGGGACCGC TATGCCCAGG GTCCCTCAAA GTGCTGGAGG 240

GGCTGTRACT TGGTGGGGAG TGGGTCTGTC ACAGCCATCC TCTGTCCAGG GTGGGGCAAG 300

GCCTGGGACA GTGCCAGGCA CCCCAGGACC CCTTCCAGGC TTGTCTCCTG CTCCACCGCC 360

TCAACACCCC CCACCCCTGC CCAAGCTGTT TCTCCTCTGC CTCTCTNNTT CCCTGCCCCA 420

GGACTTCTCT CTTCTCCTCT GCCTCTCCTT GGACCCCTGC CCTTCCTCTA CCTCTGACCT 480

GTGAACACAC AGACACATGC TCACACACTA AGTCCCARGC ACACMSAAAG GCAATGTGGA 540

CCAGCACAAA CCTCCACTCT CCCGGCTCCA TCCCARCGGG CCTGTGGCTG GCCATGAAAA 600

CTGGGGGCTA CCTGGAGGGA AGCATCCTCA TCCCAGGTGA GTGGGCACCA GCCCTTCCCT 660
GTATGTGTGT TGTGGGTGGA AGCAGGCATG AGAGCATCTT AGCCCATAGG TTTGTATTCA 720
GGGACTTCCA AACCCAGACC TACAAAGAGT GTGTCTTCTA CCAGATCTTG TTCAAAAAAG 780
GGTTTGTGAT GATGGAACTA CACGATAGAG GGAGTGAGCA AGAACAATGA GGATTAGAGT 840
GGAGCGTGAA ATAGTCTAGG AGCATGGCTT CCAAAACATA TGCTGTGAGG TCTGTCCACC 900
TGAGAGTTGG GCCATGGATT TAATTCTGAG CCTCTTAGCA GGCAAAGCAA AGACAGAAAG 960
CAGATCGGCT GTGGATTTCT GTCTATAAAA TGTGAGTTCT TGGCCGGGTG CGGTGGCTCA 1020
CGCCTGTAAT CCCGGCGCTT TGGGAGGCCA GGGCGGATCG GTCGCGAGGT CAGGAGGTTG 1080
GAAACCATCC TGGCCGGAAT GGTGAAGCCC TGACTCTACT AGAAGTGCAA AGATTGGCTG 1140
GGTGTGGTGG CGTGCGCCTG TGGTCCCAGC TTCTCGGGAG GCTGAGGCGG GAGAGTTGCT 1200
TGGGCCTGGG AGGCCGAGGT TGCGGTGAGC TGAGATCCTG CCATTGCACT TCAGCCTGGG 1260
CACAGAGCCA GACTCTGGCT CAAAAAAAAA AAAAAAAAAA ACTCGAGGGG GGCCCGTACC 1320
CAATTCGCCG NATATGATCG TAAACAAT 1348

(2) INFORMATION FOR SEQ ID NO: 177:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1502 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 177:

CTCAAAATAA ATAAATAAAT AAAAATTTGT ATTCCATTGA TTTGGGTAGA CACCAGGAAT 60
GTGCATTTCT AACAAGCTTT CCAGGCGATC CTATAGTAAG TCATCTGTGG ACTACTTTAA 120
GAAACTCTTC TATAGAGAAT GGAGTTGGAT TAATAATAGG TGATTTTTTA CACTGGACTG 180
ATTCACAAGA ACCTAAACAG TAGTCCATGA AGCTGCTCAT CTGTGGTAAC TATTTGGCCC 240
CGTCTCACTC TGAAAGCAGC AGGAGATGTT GTTTACTTTG TTTCTATCCC CTTTGTCTGG 300
AGATTAATTT TGGAATGAAA GTTTTTCTCT CTATGCCATT CCTGGTTCTT TTCCAAAGCC 360
TCATACAAGA GGATTAGGTC ACAATGCATG CATTACCTTT TAAAAGAATG CGATATTGAT 420
ACCGATGCTT ACTTTTTTTT TTTTTNACTA CTTGTTTTAT TCCTTCCAGN AAAGTATAGC 480
CCGCCTTTCT ATAGCATAGT TCTCTTTAGG TGGAATGATT CCTATAAGAT TTCTCATTAT 540
TAAATCATGC ATTTTTTCAAG ATGGAATCAA TMTTTGATTT AATCTAAGCT GATATTCTCA 600
TTTGTTAGAA GAACAACCTA CATGCTAGAG AGAGAGGAGG AAATATACCC ACGACCACAC 660

AGCCAGTTAG TATCCAGTTG GTGCTGGACT CCAGCCAGGT GTCCTGCCTC ATGGTAGTTA 720
AATGATATAT AGAAAAGGTA AATTTTTAAA GAAATATTTA TTAATATATT CCTATAAAAC 780
ATTTTAAAGG TAACCACATA AAAATGGTTA ATTTTTCCAT TCCAAAGTAA ATGCTAAGCA 840
TGTTTATTAA TGAAGCAGTA CTTCTGATTA GTATATGACA TTCTGAAGTT AATTAAACTC 900
ATTGCACTAA ATGTGTCTTC CTTGGTATAG TGGAGGATTT GAGGATTGGA ATATAGAGTA 960
GAGTGCTTGC TTAAGCCTGG GAGCCCATCT TTATAGCTAT TTGATGTAAG AAAAGAGACA 1020
TGGNCCATTT CTAAACTATA TAAGGTGAGT GTGTCTATTC CCAGCAGATA TAAAGGAAAA 1080
AGGAAACTTT TTTGATTCCC ACCTTCCCAG CCTCACCTAG CCATCTTCCA GCCTCAAATA 1140
TAGAGATGTT AGTGCAAGGT CCTGGGCTCT AGGTGATCAT TTCATAAGTC CTTTACAGAT 1200
AAAGAAAAAG TAGTGTTTGT ATGTTTGTTT TTAAGTAACC CCAAAACAAA TTTATATTGT 1260
ATTCAGCAAA ATTGGAATTC AGGTGTTTAA TTTTAGAACA TGAAGTGCCT GCTGTTTTAA 1320
GCATTGACTT GTATAAAAAG AATTGCATGT CTCCAGTAAG CTTATGGGTT TTCTCATTTT 1380
TAGGTATATG GCTTTTAATC ATGTAAAGTG AAACATTAGT TTTCTTGCAT TTTATTACAG 1440
GTTCTTTGTT GCAATAAAGA TGCTGCTGAA ATTAATTGAA AAAAAAAAAA AAAAAAACTC 1500
GA 1502

(2) INFORMATION FOR SEQ ID NO: 178:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1637 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 178:

ATTTTCTAGC CCACAAGGAC TGAAGTTCAG ATCCAAAAGT TCACTTGCTA ATTATCTTCA 60
CAAAAATGGA GAGACTTCTC TTAAGCCAGA AGATTTTGAT TTTACTGTAC TTTCTAAAAG 120
GGGTATCAAG TCAAGATATA AAGACTGCAG CATGGCAGCC CTGACATCCC ATCTACAAAA 180
CCAAAGTAAC AATTCAAACT GGAACCTCAG GACCCGAAGC AAGTGCAAAA AGGATGTGTT 240
TATGCCGCCA AGTAGTAGTT CAGAGTTGCA GGAGAGCAGA GGACTCTCTA ACTTTACTTC 300
CACTCATTTG CTTTTGAAAG AAGATGAGGG TGTTGATGAT GTTAACTTCA GAAAGGTTAG 360
AAAGCCCAAA GGAAAGGTGA CTATTTTGAA AGGAATCCCA ATTAAGAAAA CTAAAAAAGG 420
ATGTAGGAAG AGCTGTTCAG GTTTTGTTCM AAGTGATAGC AAAAGAGAAT CTGTGTGTAA 480

TAAAGCAGAT GCTGAAAGTG AACCTGTTGC ACAAAAAAGT CAGCTTGATA GAACTGTCTG 540
CATTTCTGAT GCTGGAGCAT GTGGTGAGAC CCTCAGTGTG ACCAGTGAAG AAAACAGCCT 600
TGTAAAAAAA AAAGAAAGAT CATTGAGTTC AGGATCAAAT TTTTGTTCTG AACAAAAAAC 660
TTCTGGCATC ATAAACAAAT TTTGTTCAGC CAAAGACTCA GAACACAACG AGAAGTATGA 720
GGATACCTTT TTAGAATCTG AAGAAATCGG AACAAAAGTA GAAGTTGTGG AAAGGAAAGA 780
ACATTTGCAT ACTGACATTT TAAAACGTGG CTCTGAAATG GACAACAACT GCTCACCAAC 840
CAGGAAAGAC TTCACTGAAG ATACCATCCC ACGGAACACA GATAGAAAGA AGGAAAACAA 900
GCCTGTATTT TTCCAGCAAA TATAACAAAG AAGCTCTTAG CCCCCCACGA CGTAAAGCCT 960
TTAAGAAATG GACACCTCCT CGGTCACCTT TTAATCTCGT TCAAGAAACA CTTTTTCATG 1020
ATCCATGGAA GCTTGTCATC GCTACTATAT TTCTCAATCG GACCTCAGGC AAAATGGCAA 1080
TACCTGTGCT TTGGAAGTTT CTGGAGAAGT ATCCTTCAGC TGAGGTAGCA AGAACCGCAG 1140
ACTGGAGAGA TGTGTCAGAA CTTCTTAAAC CTCTTGGTCT CTACGATCTT CGGGCAAAAA 1200
CCATTGTCAA GTTCTCAGAT GAATACCTGA CAAAGCAGTG GAAGTATCCA ATTGAGCTTC 1260
ATGGGATTGG TGCACCCTGA AGACCACAAA TTAAATAAAT ATCATGACTG GCTTTGGGAA 1320
AATCATGAAA AATTAAGTCT ATCTTAAACT CTGCAGCTTT CAAGCTCATC TGTTATGCAT 1380
AGCTTTGCAC TTCAAAAAAG CTTAATTAAG TACAACCAAC CACCTTTCCA GCCATAGAGA 1440
TTTTAATTAG CCCAACTAGA AGCCTAGTGT GTGTGCTTTC TTAATGTGTG TGCCAATGGT 1500
GGATCTTTGC TACTGAATGT GTTTGAACAT GTTTTGAGAT TTTTTTAAAA TAAATTATTA 1560
TTTGACAACA ATCCAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA 1620
AAAAAAAAAA AAAAAAA 1637

(2) INFORMATION FOR SEQ ID NO: 179:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2911 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 179:

GGTGGTTTTT GTTCTGCAAT AGGCGGCTTA GAGGGAGGGG CTTTTTCGCC TATACCTACT 60
GTAGCTTCTC CACGTATGGA CCCTAAAGGC TACTGCTGCT ACTACGGGGC TAGACAGTTA 120
CTGTCTCAGC TCTAGGATGT GCGTTCTTCC AGTAGAAGCT CTTCTGAGGG AGGTAATTAA 180
AAAACAGTGG AATGGAAAAA CAGTGCTGTA GTCATCCTGT AATATGCTCC TTGTCAACAA 240

TGTATACATT CCTGCTAGGT GCCATATTCA TTGCTTTAAG CTCAAGTCGC ATCTTACTAG 300
TGAAGTATTC TGCCAATGAA GAAAACAAGT ATGATTATCT TCCAACTACT GTGAATGTGT 360
GCTCAGAACT GGTGAAGCTA GTTTTCTGTG TGCTTGTGTC ATTCTGTGTT ATAAAGAAAG 420
ATCATCAAAG TAGAAATTTG AAATATGCTT CCTGGAAGGA ATTCTCTGAT TTCATGAAGT 480
GGTCCATTCC TGCCTTTCTT TATTTCCTGG ATAACTTGAT TGTCTTCTAT GTCCTGTCCT 540
ATCTTCAACC AGCCATGGCT GTTATCTTCT CAAATTTTAG CATTATAACA ACAGCTCTTC 600
TATTCAGGAT AGTGCTGAAG ANGCGTCTAA ACTGGATCCA GTGGGCTTCC CTCCTGACTT 660
TATTTTTGTC TATTGTGGCC TTGACTGCCG GGACTAAAAC TTTACAGCAC AACTTGGCAG 720
GACGTGGATT TCATCACGAT GCCTTTTTCA GCCCTTCCAA TTCCTGCCTT CTTTTCAGAA 780
ATGAGTGTCC CAGAAAAGAC AATTGTACAG CAAAGGAATG GACTTTTCCT GAAGCTAAAT 840
GGAACACCAC AGCCAGAGTT TTCAGTCACA TCCGTCTTGG CATGGGCCAT GTTCTTATTA 900
TAGTCCAGTG TTTTATTTCT TCAATGGCTA ATATCTATAA TGAAAAGATA CTGAAGGAAG 960
GGAACCAGCT CACTGAARGC ATCTTCATAC AGAACAGCAA ACTCTATTTC TTTGGCATTC 1020
TGTTTAATGG GCTGACTCTG GGCCTTCAGA GGAGTAACCG TGATCAGATT AAGAACTGTG 1080
GATTTTTTTA TGGCCACAGT GCATTTTCAG TAGCCCTTAT TTTTGTAACT GCATTCCAGG 1140
GCCTTTCAGT GGCTTTCATT CTGAAGTTCC TGGATAACAT GTTCCATGTC TTGATGGCCC 1200
AGGTTACCAC TGTCATTATC ACAACAGTGT CTGTCCTGGT CTTTGACTTC AGGCCCTCCC 1260
TGGAATTTTT CTTGGAAGCC CCATCAGTCC TTCTCTCTAT ATTTATTTAT AATGCCAGCA 1320
AGCCTCAAGT TCCGGAATAC GCACCTAGGC AAGAAAGGAT CCGAGATCTA AGTGGCAATC 1380
TTTGGGAGCG TTCCAGTGGG GATGGAGAAG AACTAGAAAG ACTTACCAAA CCCAAGAGTG 1440
ATGAGTCAGA TGAAGATACT TTCTAACTGG TACCCACATA GTTTGCAGCT CTCTTGAACC 1500
TTATTTTCAC ATTTTCAGTG TTTGTAATAT TTATCTTTTC ACTTTGATAA ACCAGAAATG 1560
TTTCTAAATC CTAATATTCT TTGCATATAT CTAGCTACTC CCTAAATGGT TCCATCCAAG 1620
GCTTAGAGTA CCCAAAGGCT AAGAAATTCT AAAGAACTGA TACAGGAGTA ACAATATGAA 1680
GAATTCATTA ATATCTCAGT ACTTGATAAA TCAGAAAGTT ATATGTGCAG ATTATTTTCC 1740
TTGGCCTTCA AGCTTCCAAA AAACTTGTAA TAATCATGTT AGCTATAGCT TGTATATACA 1800
CATAGAGATC AATTTGCCAA ATATTCACAA TCATGTAGTT CTAGTTTACA TGCCAAAGTC 1860
TTCCCTTTTT AACATTATAA AAGCTAGGTT GTCTCTTGAA TTTTGAGGCC CTAGAGATAG 1920
TCATTTTGCA AGTAAAGAGC AACGGGACCC TTTCTAAAAA CGTTGGTTGA AGGACCTAAA 1980
TACCTGGCCA TACCATAGAT TTGGGATGAT GTAGTCTGTG CTAAATATTT TGCTGAAGAA 2040

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GCAGTTTCTC AGACACAACA TCTCAGAATT TTAATTTTTA GAAATTCATG GGAAATTGGA      2100
TTTTTGTAAT AATCTTTTGA TGTTTTAAAC ATTGGTTCCC TAGTCACCAT AGTTACCACT      2160
TGTATTTTAA GTCATTTAAA CAAGCCACGG TGGGGCTTTT TTCTCCTCAG TTTGAGGAGA      2220
AAAATCTTGA TGTCATTACT CCTGAATTAT TACATTTTGG AGAATAAGAG GGCATTTTAT      2280
TTTATTAGTT ACTAATTCAA GCTGTGACTA TTGTATATCT TTCCAAGAGT TGAAATGCTG      2340
GCTTCAGAAT CATACCAGAT TGTCAGTGAA GCTGATGCCT AGGAACTTTT AAAGGGATCC      2400
TTTCAAAAGG ATCACTTAGC AAACACATGT TGACTTTTAA CTGATGTATG AATATTAATA      2460
CTCTAAAAAT AGAAAGACCA GTAATATATA AGTCACTTTA CAGTGCTACT TCACACTTAA      2520
AAGTGCATGG TATTTTTCAT GGTATTTTGC ATGCAGCCAG TTAACTCTCG TAGATAGAGA      2580
AGTCAGGTGA TAGATGATAT TAAAAATTAG CAAACAAAAG TGACTTGCTC AGGGTCATGC      2640
AGCTGGGTGA TGATAGAAGA GTGGGCTTTA ACTGGCAGGC CTGTATGTTT ACAGACTACC      2700
ATACTGTAAA TATGAGCTTT ATGGTGTCAT TCTCAGAAAC TTATACATTT CTGCTCTCCT      2760
TTCTCCTAAG TTTCATGCAG ATGAATATAA GGTAATATAC TATTATATAA TTCATTTGTG      2820
ATATCCACAA TAATATGACT GGCAAGAATT GGTGGAAATT TGTAATTAAA ATAATTATTA      2880
AACCTAAAAA AAAAAAAAAA AAAAACTCGA G                                     2911
```

(2) INFORMATION FOR SEQ ID NO: 180:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 519 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 180:

```
GGCACGAGCC CCAGGCCAGC CAGGGCCAGG CCTACTTTGG CCACCCTTAA ATTAGAATGT        60
GGGGTCAGGG GTCACAGAAA AGCCATTTCT CTGACCTAGT GTTTGGCGTC CGGGAACTCT       120
GTGCCCAACC TTCAGACCCT GGCAGTCCTC ACTGAGGCCA TTGGCCCAGA GCCCGCCATC       180
CCCCGARACC CCCGGGAGCC GCCTGTTGCC ACGTCCACAC CTGCCACACC CTCTGCCGGG       240
CCCCAGCCCC TCCCAACCGG GACCGTGGTG GTCCCTGGGG GTCCTGCCCC ACCTTGCCTT       300
GGGGAGGCAT GGGCCCTCCT CCTCCCACCC TGCCGGCCGT CACTCACCTC TTGCTTCTGG       360
TCCCCCAGGC CTAGCCCTTG GAAGGAGACA GGAGTCTAGG GAGGCTGAAG CCCACTCCCG       420
GGGAGGCCCG TGCTCCTCCA GCCCCAGGGA CAGCAAGGAA AAGAGAAGAG AGCAGAGCAT       480
```

TTCATGGCTC TAATAAAAAA AAAAAAAAAA AAAACTCGA 519

(2) INFORMATION FOR SEQ ID NO: 181:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 968 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 181:

TCCCCTTGGG GCCGGAAAAA GCGGGGTTGG CCTGNCCATT GGTTNTCCAT GCCGCCCGCC 60
CATGCCCCAG TACTAGCCTG CAGTCCCAAT GTAGCCCCTC CCTCYTCCMA GAGCCCYTCM 120
AACCGCCCCG STCANTTGTG ATTTCAGGAG GATTTGATGA AGATGTTAAA GCGAAAGTGG 180
AGAACCTTCT CGGGATTTCC AGCCTGGAAA AAACGGACCC TGTTAGGCAA GCACCCTGCA 240
GCCCTCCCTG TCCCCTTCTT CCCCTCCCCT TCYCCCGCCC GTGGAGACAG CTGTTYTCAG 300
CAGGGCTCTC CGCAGGGAGG GGGCCGGCTC CTTCCCTGGC AGCAACATCC TTGCCCTTGT 360
CACACAAGTC AGCCTCCATC TGCGCAGCTC TGTGGATGCG CTGCTGGAGG GCAACAGGTA 420
TGTCACTGGC TGGTTCAGCC CCTACCACCG CCAGCGGAAG CTCATCCACC CGGTCATGGT 480
TCAGCACATC CAGCCCGCAG CGCTCAGCCT CCTGGCACAG TGGAGCACCC TCGTGCAGGA 540
GCTGGAGGCT GCCCTGCAGC TGGCTTTCTA CCCGGATGCC GTGGAGGAGT GGCTGGAGGA 600
AAACGTGCAC CCCAGCCTGC AGCGGCTGCA ARCTCTGCTG CAGGACCTCA GCGACGTGTC 660
TGCCCCCCCG CTGCCACCCA CCAGCCCTGG CAGGGACGTT GCTCAGGACC CCTGAGGGGA 720
GAGCTCATGC CAGGGGGCTC CTGCTGGAGG CTGGGGGGGC TCTGCWYTKY CWWWTGGCCT 780
GGGCAATACG GCCCACGTGG GCGTCGTGCC CTCTGGCCCA GCAGTGTCTT GCCCACACTC 840
AGTTCCTGAG GGCCCTGGGC AGCCCCTGGG GGAGAGACTA GAAAACACAG AACGAAGCAG 900
CACAGGGAGA CCCGCTTTGT GATCTGCATG TGTGACACTG ATTCTTTGGA AATAAAGAGT 960
GGAAGCTG 968

(2) INFORMATION FOR SEQ ID NO: 182:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1128 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 182:

```
TGTAAAAGTT ATCAGTAATC CTAATTCTTT TCCTGGGTTT TCCTTTTGTC ACTTATTAAT     60
CAGTTTTTGA AAGGACGAAT GAATTTAGAG ATGTACTCTG GAGCAGTATC ATGTTAAACC    120
AGGGGTATAT TAGAAAAATC ATCCTCATAA TCATTCTGGG AAGTTTTTCC TCCCCAAAAA    180
AAGCCATCCT GATGGGTTTT CAAAACCAGA AAAAAGCTCT TAATGAGGAA CAGACCACTG    240
GAGTACCCAT GAGCATCTCA GGAAAACTGA GACCCTCGAG AAGCCTTGAT TTCGTGCAAC    300
CCCCAAGGTT TCAGAGCCAG CAGCCCAGTG CTGTGGTTGA CAGACGTGGT TTTKTGGRGA    360
AAGCAGCCAG AGGCCAGGAA TTTTCAGAGT CGTGAGTCAC GRTYTCCCAC CCAAGATTAG    420
AGCAMAGATT AGCCATACTG AGATTTGGTA AAATCATTCT GTCTAAGCAA TGGAGGTGTG    480
TGCAMACGTG CAGTGCCTGT TCACAGGGGA TGCAGGCAGA TCSYGGGTTT AGGATGGGGR    540
AGGCCACCGC ACCCCCYTTC AYTGCTCTGC ACCTGCTCCC TCACGTGGAC ACTGTCCACA    600
ACTGTGGCTC TCAGAGGACA GTTGCCCAAG GAGCTCATAT CTTATTGGAG ATAGGGGGTC    660
GTACAGGTGA CATTCATGAG CAGTGTGAGC CGGGTGACAT GGGGGTGTCA ACCCAGCATC    720
TGTCCAGGAG CTCCTCCTGC AGCGGCTCTG GCAGGTGGCC TGAGGCTCCT TTTTGAGAGA    780
GAACTGTTTG GCCTTCCTGT CTCCTCTCCT CTGATCTGTT CTTTCTTGGA ACACCACCCA    840
AGAACGTCAC CTCCTCCATC AGATTGTGAG CTCCTGGAGG GCAGGAGCTG TGTCCTTCTA    900
TTCATCTTCC TATCCCCAGA ACCTTGCACA GATCCTGGAA TGTGGTAGGT GCTCAGTAAA    960
TGTGTGTTGA ATAAATGAAT GAATGAATGA ACAAATGAAT GAATTTGCTT ACTTCAAGGC   1020
AAAAGAACCA TGAAACTGTA TTTTGAGTTT CTATGTTATA GCAGTCAGCA AATCCTATTA   1080
AATACTTTGT GTTTCCAAGC AAAAAAAAAA AAAAAAAAAA AAACTCGA                1128
```

(2) INFORMATION FOR SEQ ID NO: 183:

(i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 2276 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 183:

```
CCGCGGCGTC TGACCTCATG GCGTAGAGCC TAGCAACAGC GCAGGCTCCC AGCCGAGTCC     60
GTTATGGCCG CTGCCGTCCC GAAGAGGATG AGGGGGCCAG CACAAGCGAA ACTGCTGCCC    120
GGGTCGGCCA TCCAAGCCCT TGTGGGGTTG GCGCGGCCGC TGGTCTTGGC GCTCCTGCTT    180
GTGTCCGCCG CTCTATCCAG TGTTGTATCA CGGACTGATT CACCGAGCCC AACCGTACTC    240
```

AACTCACATA TTTCTACCCC AAATGTGAAT GCTTTAACAC ATGAAAACCA AACCAAACCT 300
TCTATTTCCC AAATCAGCAC CACCCTCCCT CCCACGACGA GTACCAAGAA AAGTGGAGGA 360
GCATCTGTGG TCCCTCATCC CTCGCCTACT CCTCTGTCTC AAGAGGAAGC TGATAACAAT 420
GAAGATCCTA GTATAGAGGA GGAGGATCTT CTCATGCTGA ACAGTTCTCC ATCCACAGCC 480
AAAGACACTC TAGACAATGG CGATTATGGA GAACCAGACT ATGACTGGAC CACGGGCCCC 540
AGGGACGACG ACGAGTCTGA TGACACCTTG GAAGAAAACA GGGGTTACAT GGAAATTGAA 600
CAGTCAGTGA AATCTTTTAA GATGCCATCC TCAAATATAG AAGAGGAAGA CAGCCATTTC 660
TTTTTTCATC TTATTATTTT TGCTTTTTGC ATTGCTGTTG TTTACATTAC ATATCACAAC 720
AAAAGGAAGA TTTTTCTTCT GGTTCAAAGC AGGAAATGGC GTGATGGCCT TTGTTCCAAA 780
ACAGTGGAAT ACCATCGCCT AGATCAGAAT GTTAATGAGG CAATGCCTTC TTTGAAGATT 840
ACCAATGATT ATATTTTTTA AAGCACTGTG ATTTGAATTT GCTTATGTAA TTTTATTTGC 900
TTGACTTTTT ATATGATATT GTGCAAATGT TTGCCATAGG CAATTGGTAC TTAAATGAGA 960
GGTGAGTCTC TCTTTTGCCT TGGTGCTTTG GAAATTAAAT GTCACAAACG AGTATATAAT 1020
TTTTTATCTG TACTTTTAGA GCTGAGTTTA ATCAGGTGTC CAAAATGTGA GTTAAACATT 1080
ACCTTATATT TACACTGTTA GTTTTTATTG TTTTAGATTT ATTATGCTTC TTCTGGAAGT 1140
ATTAGTGATG CTACTTTTAA AAGATCCCAA ACTTGTAACT AAATTCTGAC ATATCTGTTA 1200
CTGCTGACTC ACATTCATTC TCCGCCATTC AAATACTATT TTTTATCCAC ATTTTTTTTT 1260
GTTCCCAAAC TGTAATGTAC AAGGATATGT GTGATAATGC TTTGGATTTG AGTAATATTT 1320
TTTTTTCTTC CAAGAAAACT GCTTTGGATA TTTTTAGATA ATTTAAACAT AATTTAGGAT 1380
AATGATATTG CTCAATCTGA CCACAATTTT AGGTAAAACA TTAAATGTGT CAGAAATCTT 1440
GGCAACAGAG ACTCTGCAGC TTGCAGTGGA CATAGATAAA ATGTTACAGA GATACTATTT 1500
TTTTGGTTGG AATTACTATA TTAAATTTAG AAGCAGAAAC TGGTAAAATG TTAAATACAT 1560
GTACAATTGC TTTTAGTTAG CAATTGATTG TAGCATGGGT TCCTCCAAGG TTTCAAGCAA 1620
TGGGCAGAGT TTAAAATTAT ATCAGATTCG TTTACTTCGT TTATTATTTT ACAGTAAATT 1680
TGAATAAATC TTAGGGGTCA TTATCACTTA AATAATACTG TACCTAGGTC TTTCAAATTA 1740
AAATTATACC TGAATGAAGT TGTTTGTATA CATAAAGGAT ATTTGTGTAC AATTACCTTT 1800
TTTCCCCCAC ACTTGTTTTC TTTGTTTTTG TTTTTTATGG CAACTGGAAA GTATTTACTA 1860
TGGGATTCAT TTATGTCTGT CTTTCTATCA TAAAGAATTG ATCAATATGT AAATATGTGA 1920
TTTGAACCAT GGTTGACTTA CAAGTGTCAC TACAGCTTTT TAGAAAACAT AGCCCTAATA 1980
TATGTTAAGC AGGACCCGGG TGAGCCAGTG GGCTTGCGCT TTATGTAGAG CTGGAAGAAG 2040

GCCGTCCATC CTGTCTCTTG GGCGGACAGT GTACTTTCCT AATAGGGAAG GGAAGCACAA 2100

TGGAAATACC CCTGAACCGT TTTATTGCAG TAATTTTTTT CATATCTGAA ACTATTATTT 2160

AATATTTTGA ATAAGATTTT AAAAAATAAA TGGCAAAGAT ATAAATCTAA AAAAAAAAAA 2220

AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAA 2276

(2) INFORMATION FOR SEQ ID NO: 184:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2500 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 184:

TCCAAGCTAC GCCACTCGGG CTGGGGCGTT GGGAGCGGGA GTGCAGAGCG TGGTCGTGGC 60

GGCGGCGGTG AGAAGAGCGA GGCGKAGGAG GGGGTGCCAT GGCCGGGCAG CAGTTCCAGT 120

ACGATGACAG TGGGAACACC TTCTTCTACT TCCTCACCTC CTTCGTGGGG CTCATCGTGA 180

TCCCGGCGAC ATACTACCTC TGGCCCCGAG ATCAGAATGC CGAGCAAATT CGATTAAAGA 240

ATATCAGAAA AGTATATGGA AGGTGTATGT GGTACGTTTA CGGTTATTAA AACCCCAGCC 300

AAATATTATT CCTACAGTAA AGAAAATAGT TCTGCTTGCA GGATGGGCAT TGTTCTTATT 360

CCTTGGATAT AAAGTTTCCA AAACAGACCG AGAATACCAA GAATACAATC CTTATGAAGT 420

ATTAAATTTG GATCCTGGAG CCACAGTAGC AGAAATTAAA AAACAATATC GTTTGCTGTC 480

ACTTAAATAT CATCCAGATA AAGGAGGTGA TGAGGTTATG TTCATGAGGA TAGCAAAAGC 540

TTATGCTGCT TTAACGGATG AAGAGTCCCG GAAAAATTGG GAAGAATTTG GAAATCCAGA 600

TGGGCCTCAA GCCACAAGCT TTGGAATTGC CCTGCCAGCT TGGATAGTTG ACCAGAAAAA 660

TTCAATTCTG GTTTTACTTG TATATGGATT GGCATTTATG GTTATCCTTC CAGTTGTTGT 720

GGGCTCTTGG TGGTATCGCT CAATACGCTA TAGTGGAGAC CAGATTCTAA TACGSACAAC 780

ACAGATTTAT ACATACTTTG TTTATAAAAC CCGAAATATG GATATGAAAC GTCTTATCAT 840

GGTTTTGGST GGAGCTTCTG AATTTGATCC TCAGTATAAT AAAGATGCCA CAAGCAGACC 900

AACGGATAAT ATTCTAATAC CACAGCTAAT CAGAGAAATT GGCAGCATTA ATTTAAAGAA 960

GAATGAGCCT CCACTTACCT GCCCATATAG CCTGAAGGCC AGAGTTCTTT TACTGTCTCA 1020

TCTTGCTAGA ATGAAAATTC CTGAGACCCT TGAAGAAGAT CAGCAATTCA TGCTAAAAAA 1080

GTGTCCTGCC CTACTTCAAG AAATGGTTAA TGTAATCTGC CAACTAATAG TAATGGCCCG 1140

GAACCGTGAA GAAAGGGAGT TTCGTGCTCC AACTTTGGCA TCCCTAGAAA ACTGCATGAA 1200

GCTTTCTCAG ATGGCCGTTC AGGGACTTCA GCAATTTAAG TCTCCCCTTC TGCAGCTCCC 1260

TCATATTGAA GAGGACAATC TTAGACGGGT TTCTAATCAT AAGAAGTATA AAATTAAAAC 1320

TATCCAGGAT TTGGTGAGTT TAAAAGAATC AGATCGTCAC ACTCTACTGC ACTTCCTTGA 1380

AGATGAAAAA TATGAAGAGG TTATGGCTGT CCTTGGGAGT TTTCCATATG TGACCATGGA 1440

TATAAAATCA CAGGTGTTAG ATGATGAAGA TAGCAACAAC ATCACAGTAG GATCCTTAGT 1500

TACAGTGTTG GTTAAGTTGA CAAGGCAAAC AATGGCTGAA GTATTTGAAA AGGAGCAGTC 1560

CATCTGTGCT GCAGAGGAAC AGCCAGCAGA AGATGGGCAG GGTGAAACTA ACAAGAACAG 1620

GACAAAAGGA GGATGGCAAC AGAAGAGTAA AGGACCCAAG AAAACTGCTA AATCAAAAAA 1680

AAAGAAACCT TTAAAAAAAA AACCTACACC TGTGCTATTA CCACAGTCAA AGCAACAGAA 1740

ACAAAAGCAG GCAAATGGAG TCGTTGGGAA TGAAGCTGCA GTAAAGGAAG ATGAAGAAGA 1800

AGTTTCAGAT AAGGGCAGTG ATTCTGAAGA AGAAGAAACC AATAGAGATT CCCAAAGTGA 1860

GAAAGATGAT GGTAGTGACA GAGACTCTGA TAGAGAGCAA GATGAAAAAC AAAACAAAGA 1920

TGATGAAGCA GAGTGGCAAG AATTACAACA AAGCATACAG CGAAAAGAGA GAGCTCTATT 1980

GGAAACCAAA TCAAAAATAA CACATCCTGT GTATAGCCTT TACTTTCCTG AGGAAAAACA 2040

AGAATGGTGG TGGCTTTACA TTGCAGATAG GAAGGAGCAG ACATTAATAT CCATGCCATA 2100

TCATGTGTGT ACGCTGAAAG ATACAGAGGA GGTAGAGCTG AAGTTTCCTG CACCAGGCAA 2160

GCCTGGAAAT TATCAGTATA CTGTGTTTCT GAGATCAGAC TCCTATATGG GTTTGGATCA 2220

GATTAAACCA TTGGAAGTTK GGAAGTTCAT GAGGCTGAAG CCTGTGCCAG AAAATCACCC 2280

ACAGTGGGAT ACAGCAATAG AGGGGGATGA AGACCAGGAG GACAGTGAGG GCTTTGAAGA 2340

TAGCTTTGAG GGAGGAAGAG GGAGGGAGGA AGGAAGGTGG TGGACTTAAG GCAGTTACTC 2400

TGGAATGGGA CCCACAGTGT TTTGCACCAT ATTTTGGCAA TTTTTTTTGC CCGTTTTTNG 2460

GAAGTGTTTT CCNTNAANCC CAGGAACCAT TACAGAACCG 2500

(2) INFORMATION FOR SEQ ID NO: 185:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1337 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 185:

CTTCCGGTTC TCCGGGCAGC TGCCACTGCT GTAGCTTCTG CCACCTGCCA CGACCGGGCC 60

TCTCCCTGGC GTTTGGTCAC CTCTGCTTCA TTCTCCACCG CGCCTATGGT CCCTCTTGGA 120

GCCAGCGTGG CGGGCCTGGC GGCTCCCGGG TGGTGAGAGA GCGGTCCGGG AACGATGAAG 180

GCCTCGCAGT GCTGCTGCTG TCTCAGCCAC CTCTTGGCTT CCGTCCTCCT CCTGCTGTTG 240

CTGCCTGAAC TAAGCGGGYC CCTGGMAGTC CTGCTGCAGG CAGCCGAGGC CGCGCCAGGT 300

CTTGGGCCTC CTGACCCTAG ACCACGGACA TTACCGCCGC TGCCACCGGG CCCTACCCCT 360

GCCCAGCAGC CGGGCCGTGG TCTGGCTGAA GCTGCGGGGC CGCGGGGCTC CGAGGGAGGC 420

AATGGCAGCA ACCCTGTGGC CGGGCTTGAG ACGGACGATC ACGGAGGGAA GGCCGGGGAA 480

GGCTCGGTGG GTGGCGGCCT TGCTGTGAGC CCCAACCCTG GCGACAAGCC CATGACCCAG 540

CGGGCCCTGA CCGTGTTGAT GGTGGTGAGC GGCGCGGTGC TGGTGTACTT CGTGGTCAGG 600

ACGGTCAGGA TGAGAAGAAG AAACCGAAAG ACTAGGAGAT ATGGAGTTTT GGACACTAAC 660

ATAGAAAATA TGGAATTGAC ACCTTTAGAA CAGGATGATG AGGATGATGA CAACACGTTG 720

TTTGATGCCA ATCATCCTCG AAGATAAGAA TGTGCCTTTT GATGAAAGAA CTTTATCTTT 780

CTACAATGAA GAGTGGAATT TCTATGTTTA AGGAATAAGA AGCCACTATA TCAATGTTGG 840

GGGGGTATTT AAGTTACATA TATTTTAACA ACCTTTAATT TGCTGTTGCA ATAAATACCG 900

TATCCTTTTA TTATATCTTT ATATGTATAG AAGTACTCTR TTAATGGGCT CAGAGATGTT 960

GGGGATAAAG TATACTGTAA TAATTTATCT GTTTGAAAAT TACTATAAAA CGGTGTTTTC 1020

TGATCGGTTT TTGTTTCCTG CTTACCATAT GATTGTAAAT TGTTTTATGT ATTAATCAGT 1080

TAATGCTAAT TATTTTTGCT GATGTCATAT GTTAAAGAGC TATAAATTCC AACAACCAAC 1140

TGGTGTGTAA AAATAATTTA AAATTTCCTT TACTGAAAGG TATTTCCCAT TTTTGTGGGG 1200

AAAAGAAGCC AAATTTATTA CTTTGTGTTG GGGTTTTTAA AATATTAAGA AATGTCTAAG 1260

TTATTGTTTG CAAAACAATA AATATGATTT TAAATTCTCT TAAAAAAAAA AAAAAAAACC 1320

CCGGGGGGGG GCCCGGN 1337

(2) INFORMATION FOR SEQ ID NO: 186:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 941 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 186:

GGCACGAGCC TGGACGCAGC AGCCACCGCC GCGTCCCTCT CTCCACGAGG CTGCCGGCTT 60

AGGACCCCCA GCTCCGACAT GTCGCCCTCT GGTCGCCTGT GTCTTCTCAC CATCGTTGGC 120

CTGATTCTCC CCACCAGAGG ACAGACGTTG AAAGATACCA CGTCCAGTTC TTCAGCAGAC 180

TCAACTATCA TGGACATTCA GGTCCCGACA CGAGCCCCAG ATGCAGTCTA CACAGAACTC 240

CAGCCCACCT CTCCAACCCC AACCTGGCCT GCTGATGAAA CACCACAACC CCAGACCCAG 300

ACCCAGCAAC TGGAAGGAAC GGATGGGCCT CTAGTGACAG ATCCAGAGAC ACACAAGAGC 360

ACCAAAGCAG CTCATCCCAC TGATGACACC ACGACGCTCT CTGAGAGACC ATCCCCAAGC 420

ACAGACGTCC AGACAGACCC CCAGACCCTC AAGCCATCTG GTTTTCATGA GGATGACCCC 480

TTCTTCTATG ATGAACACAC CCTCCGGAAA CGGGGGCTGT TGGTCGCAGC TGTGCTGTTC 540

ATCACAGGCA TCATCATCCT CACCAGTGGC AAGTGCAGGC AGCTGTCCCG GTTATGCCGG 600

AATCATTGCA GGTGAGTCCA TCAGAAACAG GAGCTGACAA CCYGCTGGGC ACCCGAAGAC 660

CAAGCCCCCT GCCAGCTCAC CGTGCCCAGC CTCCTGCATC CCCTCGAAGA GCCTGGCCAG 720

AGAGGGAAGA CACAGATGAT GAAGCTGGAG CCAGGGCTGC CGGTCCGAGT CTCCTACCTC 780

CCCCAACCCT GCCCGCCCCT GAAGGCTACC TGGCGCCTTG GGGGCTGTCC CTCAAGTTAT 840

CTCCTCTGYT AAGACAAAAA GTAAAGCACT GTGGTCTTTG CAAAAAAAAA AAAAAAAAAA 900

AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAACTCG A 941

(2) INFORMATION FOR SEQ ID NO: 187:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 654 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 187:

GAATTCGGCA CGAGGCAGCT TGTGCTTTAA AGGAGGTGTT CAAAGCATGT CTGAGCAGAG 60

ACTTTTGGGC TCTGTTTTAA TTAATACTTT AAAATAATTC ATATTTAAAA TATCARATGT 120

TTCCATAAAG AGGAGGATGT TTAAATGCCT CCAGACTACA TTCCTTTTTA TTSCTTGATT 180

TTACCTGGGA GTCCAAAGTT CAATTCCCAT AAAGCAAGCG TTTTATTTGT CACTTTCAAT 240

ATACATCCGA TTGCCATGCT TAAGATGCAA TATGGGCTGC GGAAATAGGT TAACCCACAG 300

GCTCCCAGGG CCCAGTGTAG AAGGTGAGAG ATTCGTGTAA AATGATTCAA ATAAAAGGAA 360

GACCCTGGCC GGGTGCCGTA RCTCACGCCT GTAATCCCAG CACTTTGGGA GGCCGAAGCG 420

AGTGGATGAC GAGGTTAGGA GTTGGAGACC AGCCTGGCCA ACATCGTGAA ACCCCGTCTC 480

TACTAAAAAT ACAAAAATTA GCCGGGCATG GTGGCAGGCA CCTGTAATCC TAGCTAGTTG 540

GGAGGCTGAG GCAGGAGAAT CGTTTGAATC TGGGAGTTGG AGGTTGTCAG TGAGCTGAGA 600

TCGCGCCACA GCACTCCAGC CTGGGTGACA GGGTGAGACT CTGTCTCAAA NAGA 654

(2) INFORMATION FOR SEQ ID NO: 188:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1848 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 188:

GAAACTGGAC CGGAGAACCG GAGCGAAGCG AAGCGGAAGC CCGGAATGAG GCCGGACTGG 60

AAAGCCGGAG CGGGGCCAGG CGGGCCTCCC CAAAAGCCTG CCCCTTCATC CCAGCGGAAA 120

CCGCCGGCCC GGCCGAGCGC GGCGGCCGCT GCGATTGCAG TCGCGGCGGC GGAGGAAGAG 180

AGACGGCTCC GGCAGCGGAA CCGCCTGAGG CTGGAGGAGG ACAAACCGGC CGTGGAGCGG 240

TGCTTGGAGG AGCTGGTCTT CGGCGACGTC GAGAACGACG AGGACGCGTT GCTGCGGCGT 300

CTGCGAGGCC CGAGGGTTCA AGAACATGAA GACTCGGGTG ACTCAGAAGT GGAGAATGAA 360

GCAAAAGGTA ATTTTCCACC TCAAAAGAAG CCAGTTTGGG TGGATGAAGA AGATGAAGAT 420

GAGGAAATGG TTGACATGAT GAACAATCGG TTTCGGAAGG ATATGATGAA AAATGCTAGT 480

GAAAGTAAAC TTTCGAAAGA CAACCTTAAA AAGAGACTTA AAGAAGAATT CCAACATGCC 540

ATGGGAGGAG TACCTGCCTG GGCAGAGACT ACTAAGCGGA AAACATCTTC AGATGATGAA 600

AGTGAAGAGG ATGAAGATGA TTTGTTGCAA AGGACTGGGA ATTTCATATC CACATCAACT 660

TCTCTTCCAA GAGGCATCTT GAAGATGAAG AACTGCCAGC ATGCGAATGC TGAACGTCCT 720

ACTGTTGCTC GGATCTCCAT CTGTGCAGTT CCATCCCGGT GCACAGATTG TGATGGTTGC 780

TGGGATTAGA TAATGCTGTA TCACTATTTC AGGTTGATGG GAAAACAAAT CCTAAAATTC 840

AGAGCATCTA TTTGGAAAGG TTTCCAATCT TTAAGGCTTG TTTTAGTGCT AATGGGGAAG 900

AAGTTTTAGC CACGAGTACC CACAGCAAGG TTCTTTATGT CTATGACATG CTGGCTGGAA 960

AGTTAATTCC TGTGCATCAA GTGAGAGGTT TGAAAGAGAA GATAGTGAGG AGCTTTGAAG 1020

TCTCCCCAGA TGGGTCCTTC TTGCTCATAA ATGGCATTGC TGGATATTTG CATTTGCTAG 1080

CAATGAAGAC CAAAGAACTG ATTGGAAGCA TGAAAATTAA TGGAAGGGTT GCAGCATCCA 1140

CATTCTCTTC AGATAGTAAG AAAGTATACG CCTCTTCGGG GGATGGAGAA GTTTATGTTT 1200

GGGATGTGAA CTCAAGGAAG TGCCTTAACA GATTTGTTGA TGAAGGCAGT TTATATGGAT 1260

TAAGCATTGC CACATCTAGG AATGGACAGT ATGTTGCTTG TGGTTCTAAT TGTGGAGTGG 1320

TAAATATATA CAATCAAGAT TCTTGTCTCC AAGAAACAAA CCCAAAGCCA ATAAAAGCTA 1380

TAATGAACTT GGTTACAGGT GTTACTTCTC TGACCTTCAA TCCTACTACA GAAATCTTGG 1440

CAATTGCTTC AGAAAAAATG AAAGAAGCAG TCAGATTGGT TCATCTTCCT TCCTGTACAG 1500

TATTTTCAAA CTTCCCAGTC ATTAAAAATA AGAATATTTC TCATGTTCAT ACCATGGATT 1560

TTTCTCCGAG AAGTGGATAC TTTGCCTTGG GGAATGAAAA GGGCAAGGCC CTGATGTATA 1620

GGTTGCACCA TTACTCAGAC TTCTAAAGAG ACTATTTGAA GTCCAGTTGA GTCACAAGAG 1680

AAGCCTGTCT TGATATATCA TCTCAGAAAC TTTCCTGAAT ATGTGATAAT ATATGGAAAA 1740

TGATTTATAG ATCCAGCTGT GCTTAAGAGC CAGTAATGTC TTAATAAACA TGTGGCAGCT 1800

TTTGTTTGAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAACTCGA 1848

(2) INFORMATION FOR SEQ ID NO: 189:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1146 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 189:

AAAAAAAACC CAGGGGAACN TTGGGGGCCG CTTTNNNTTC CCCCTCCAGG CCATTGGGGA 60

ATTCTTCAAG TTAATCCTGC TTTGCTCTTG GCCAACAGGG CTTGTAGGGG GGAGAGACCC 120

AGGATCATCA AGGGGTTCGA GTGCAAGCCT CACTCCCAGC CCTGGCAGGC AGCCCTGTTC 180

GAGAAGACGC GGCTACTCTG TGGGGCGACG CTCATCGCCC CCAGATGGCT CCTGACAGCA 240

GCCCACTGCC TCAAGCCCCG CTACATAGTT CACCTGGGGC AGCACAACCT CCAGAAGGAG 300

GAGGGCTGTG AGCAGACCCG GACAGCCACT GAGTCCTTCC CCCACCCCGG CTTCAACAAC 360

AGCCTCCCCA ACAAAGACCA CCGCAATGAC ATCATGCTGG TGAAGATGGC ATCGCCAGTC 420

TCCATCACCT GGGCTGTGCG ACCCCTCACC CTCTCCTCAC GCTGTGTCAC TGCTGGCACC 480

AGCTGYCTCA TTTCCGGCTG GGGCAGMACG TCCAGCCCCC AGTTACGCCT GCCTCACACC 540

TTGSGATGCG CCAACATCAC CATCATTGAG CACCAGAAGT GTGAGAACGC CTACCCCGGC 600

AACATCACAG ACACCATGGT GTGTGCCAGC GTGCAGGAAG GGGGCAAGGA CTCCTGCCAG 660

GGTGACTCCG GGGGCCCTCT GGTCTGTAAC CAGTCTCTTC AAGGCATTAT CTCCTGGGGC 720

CAGGATCCGT GTGCGATCAC CCGAAAGCCT GGTGTCTACA CGAAAGTCTG CAAATATGTG 780

GACTGGATCC AGGAGACGAT GAAGAACAAT TAGACTGGAC CCACCCACCA CAGCCCATCA 840

```
CCCTCCATTT CCACTTGGTG TTTGGTTCCT GTTCACTCTG TTAATAAGAA ACCCTAAGCC     900
AAGACCCTCT ACGAACATTC TTTGGGCCTC CTGGACTACA GGAGATGCTG TCACTTAATA     960
ATCAACCTGG GGTTCGAAAT CAGTGAGACC TGGATTCAAA TTCTGCCTTG AAATATTGTG    1020
ACTCTGGGAA TGACAACACC TGGTTTGTTC TCTGTTGTAT CCCCAGCCCC AAAGACAGCT    1080
CCTGGCCATA TATCAAGGTT TCAATAAATA TTTGCTAAAT GAAAAARAAA AAAAAAAAAA    1140
ACTCGA                                                              1146
```

(2) INFORMATION FOR SEQ ID NO: 190:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 906 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 190:

```
ACTCCCTCAC CCAGGTCCCA GCCCTGGGAA CCACCTACCG TGAGCCCTTT TGCAGATATA      60
GACTCATTTC ATCCTCAGAT GGTCCTTCAA GGTAGGTACT TTAGTCCCAT TTTAGAGATG     120
AGACGATTGA GGCCAGAGGG GTGNNGTAAC TTGCCTGGGG GCTCACGAGC ACAAAAGGAG     180
CCGAGGCAGG ATCTGACCCT TGTTCTCTGG CCTCACTGCC CTCACTTTGC CATGACCCGA     240
AGTTATGTCC CTACAAAGCA ATGCATGGTC CAAGGYTCTT TTTATTGTAT TTTTATTTTT     300
AAGGGTCCTG TTCAAAACTG GTGTGAGCTC TGAGGAGTCC TGAACCCTGG GTGCAGCATC     360
CTAGCATCCT GGGAGTCCTT TTCTGCCCAC ACTGAGCTGG GCTCCTCGAG GGGTGGGGCT     420
GCTGTCCCTG GAAGCCTGGC AGCAGCACTG TATCGGGTTG GCTGAAGCTG ARCGCCGTGG     480
GGTGCAGGGC TCCMGGAATC CCCGTTTGGC TGAAGGGGTT CCCTGTAGCC MGGGATGTTT     540
ATGAGGTCTC TCTGATGCCC CAGGCGCAGG ACATGTGTGC GGGTGGAGAA AAGCAGGCCC     600
TTTCAGTGCC AGCTCCACTC AATTTCTATG TGGACCAAGA ACGATAAACT TAAAAAATTT     660
TTTTTCCTAA GGTATCTTCA GAATATGGTG TATTTTTATG TGGAAAAGAA AAGTTATGAA     720
GGCAGCTGTT ACTTTAAGAG AAAATTCATT AAAAGTCCTC GAGGTATGAA GATGACGGCG     780
TGCTTCTCAA TCATTTTGGC ATAACTTGAT TGTGGCTGTA ATTTTTTTTT TTTTTTTTGT     840
CAAGCATGTC AGACAATAAA GTCTTTGTAA AAAGRGAAAA AAAAAAAAAA AAAAAAAAAA     900
ACTCGA                                                               906
```

(2) INFORMATION FOR SEQ ID NO: 191:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1941 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 191:

```
CTTCAGCTGA AGCCCAGGGA CGCCTTTTCC ACCCTGGGCC CCAATGCCGT CCTTTCCCCG     60
CAGAGACTGG TCTTGGAAAC CCTCAGCAAA CTCAGCATCC AGGACAACAA TGTGGACCTG    120
ATTCTGGCCA CACCCCCCTT CAGCCGCCTG GAGAAGTTGT ATAGCACTAT GGTGCGCTTC    180
CTCAGTGACC GAAAGAACCC GGTGTGCCGG AGATGGCTGT GGTACTGCTG GCCAACCTGG    240
CTCAGGGGGA CAGCCTGGCA GCTCGTGCCA TTGCAGTGCA GAAGGGCAGT ATCGGCAACC    300
TCCTGGGCTT CCTAGAGGAC AGCCTTGCCG CCACACAGTT CCAGCAGAGC CAGGCCAGCC    360
TCCTCCACAT GCAGAACCCA CCCTTTGAGC CAAYTAGTGT GGACATGATG CGGCGGGCTG    420
CCCGCGCGCT GCTTGCCTTG GCCAAGGTGG ACGAGAACCA CTCAGAGTTT ACTCTGTACG    480
AATCACGGCT GTTGGACATC TCGGTATCAC CGTTGATGAA CTCAKTGGTT TCACAAGTCA    540
TTTGTGATGT ACTGTTTTTG NATTGGCCAG TCATGACAGC CGTGGGACAC CTCCCCCCCC    600
CGTGTGTGTG TGCGTGTGTG GAGAACTTAG AAACTGACTG TTGCCCTTTA TTTATGCAAA    660
ACCACCTCAG AATCCAGTTT ACCCTGTGCT GTCCAGCTTC TCCCTTGGGA AAAAGTCTCT    720
CCTGTTTCTC TCTCCTCCTT CCACCTCCCC TCCCTCCATC ACCTCACGCC TTTCTGTTCC    780
TTGTCCTCAC CTTACTCCCC TCAGGACCCT ACCCCACCCT CTTTGAAAAG ACAAAGCTCT    840
GCCTACATAG AAGACTTTTT TTATTTTAAC CAAAGTTACT GTTGTTTACA GTGAGTTTGG    900
GGAAAAAAAA TAAAATAAAA ATGGCTTTCC CAGTCCTTGC ATCAACGGGA TGCCACATTT    960
CATAACTGTT TTTAATGGTA AAAAAAAAAA AAAAAAATAC AAAAAAAAAT TCTGAAGGAC   1020
AAAAAAGGTG ACTGCTGAAC TGTGTGTGGT TTATTGTTGT ACATTCACAA TCTTGCAGGA   1080
GCCAAGAAGT TCGCAGTTGT GAACAGACCC TGTTCACTGG AGAGGCCTGT GCAGTAGAGT   1140
GTAGACCCTT TCATGTACTG TACTGTACAC CTGATACTGT AAACATACTG TAATAATAAT   1200
GTCTCACATG GAAACAGAAA ACGCTGGGTC AGCAGCAAGC TGTAGTTTTT AAAAATGTTT   1260
TTAGTTAAAC GTTGAGGAGA AAAAAAAAAA AGGCTTTTCC CCCAAAGTAT CATGTGTGAA   1320
CCTACAACAC CCTGACCTCT TTCTCTCCTC CTTGATTGTA TGAATAACCC TGAGATCACC   1380
TCTTAGAACT GGTTTTAACC TTTAGCTGCA GCGNCTACGT CNAWCGNTGT GTATATATAT   1440
GACGTKGTAC ATTGCACATA CCCTTGGATC CCCACAGTTK GGTCCTCCTC CCAGCTACCC   1500
```

CTTTATAGTA TGACGAGTTA ACAAGTTGGT GACCTGCACA AAGCGAGACA CAGCTATTTA 1560

ATCTCTTGCC CAGATATCGC CCCTCTTGGT GCGATGCTGT ACAGGTCTCT GTAAAAAGTC 1620

CTTGCTGTCT CAGCAGCCAA TCAACTTATA GTTTATTTTT TTCTGGGTTT TTGTTTTGTT 1680

TTGTTTTCTT TCTAATCGAG GTGTGAAAAA GTTCTAGGTT CAGTTGAAGT TCTGATGAAG 1740

AAACACAATT GAGATTTTTT CAGTGATAAA ATCTGCATAT TTGTATTTCA ACAATGTAGC 1800

TAAAACTTGA TGTAAATTCC TCCTTTTTTT CCTTTTTTGG CTTAATGAAT ATCATTTATT 1860

CAGTATGAAA TCTTTATACT ATATGTTCCA CGTGTTAAGA ATAAATGTAC ATTAAATCTT 1920

GGTAAGACTT TAAAAAAAAA A 1941

(2) INFORMATION FOR SEQ ID NO: 192:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2118 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 192:

AAATAATAAT AANAATAAAT AAAAATWAAG TGCTTAKTGT AACTCAGCGG ACAGGGCTCC 60

CAGCTGCTCT GGCACGTGGG ACACCYTCCA CCCTGCACAC AACAGGCATG CAAAGAGGAC 120

TGGATATGGT GGGGTAGAGT GCTTCTGGTG TGTTCACTTT AAGAAAACAT CTGCCAAGAG 180

AGAAGAGTGC CCAGGAAAGA CCAGGAAAAT ACAAGTACAT GGCTGCTTCA TACCATATAC 240

CCCAATTCTT TAAAGCAGCA AAAGGCACTT TTTTTTTCAG GCCAGAGTGA ATCTAAAACA 300

AACCTGGCTT TGCTTACAGG GAAGCTGTCC CAGAAGGACT GAGTGATGCC TCTTGTTCCC 360

TAAGGTCTGG AGAGTCTTTG CAAGTTTCCA ACGACATTTC CAACCAGGTG GGAGAGACCA 420

GCAGTTGACG AGACAAGTCA GACCCAAAAA ACGACGCCAA GGTAGTGAGT GGGTGCCTAT 480

TTGGGAGTAG GATGATTTGA GGAAAACAGG AAGAAAAACC GGTCAGAAAG TGGCACTTTG 540

GAAGTGGAAA GCTGTTTGCA AATAGCAACT CTGGCTAAAG CGAAAATGTT AATCAAGTAG 600

AAAGTAAAAT TCAGGATCTT AGAAGCTCAT CCTTCTGATG AGAACTATTT TTTTTTCCGT 660

GAAGGAACTA TTATTACTTT AAAAGTGAGG GTAATTTACA TATGGGGTGT ATATATTCTA 720

AAAATAGTAA TAAAAGTACC TTTTATAAGC AATGTTGTGT GGCTTGTAGA AGAAAGCAGG 780

GAGGAAAAAA AGGCAGGCAA AACTAGTCTA GGTCTAGGCC CTAAAAATGA GCTTCCTTCC 840

CACTTGACTG GAAACGCCCA TGTGATTTCT AGGCTGAAAA TAGGTAGGAT TTAACGAGTA 900

ACCTAGTTCC CTTCTGTCTC TGATTTCTGA TCAGCTGATG GAGCTGCTAG TAAGAGGGGC 960

CGATCATGCT CCCAGACGAG TCCTTTGGCC TCTTGCTCTC CATCCCAAGC CTGACTCCTT 1020

CAGCAGCAGC CCCCTCCTTC TGTGTCCATC TGATGCAGGC AAGCAGGAGC AGTAAGAGGG 1080

CATCCCATGT TCCAGTTCAC CTTCTATGGG GTGACTARGA GGTTCCCGGT AACTAGGGCA 1140

GCCCARGCCC AGCAGGTTGC AAAAGCAGCT GCAAGCTTCA GAAACCCACT TCCTCCAACA 1200

CCAGGGAGGT GGCAGAGAGC CCATCCAAAA GCCCACTGGG AGAGGCATAA GATTCTGTGC 1260

CAGGCCCCCA GGTCCCCTCT GTGTCAGGTA GGCTCTGCTA CTGGCCTCTG AAGTAAAGGC 1320

AAANACAAAC GGGCAGGGCA GGGTGGCAGG AATAAAAAAC TCTGGACAGA AACCCTTTTA 1380

ATAAAGGAAA TTCCACCCCT CCCAATCCTT CCATGGAAGG GTGAGACCTT AATGTGATGT 1440

AAGAGGAAGG TCTTCTCTGG CTTTCAGGGA AACAGCTGCA GCTGAAACTT AGGGGCCCAT 1500

TCCAGGGCAC TTTTCACCAC AGCCAGTGCA GCCGCTCCAA GTGCCACTGT CAGCCCCATC 1560

ACTGCCAATT TCACAAAGCG GTTGGTCCTT GGCTTGGTCA GGACATCTTT TGTTCGATCT 1620

TCAGGCCGCA GAAGTCCCCG AANACCGCTG CCGCAGCACC ATATCAGGCC TCTGCTGGGC 1680

TGATGCCAGC TCAAAGTCTT TGAAAGTAGA GGCTGCCGTC CTCTCAGCTT GCTGTTGGGC 1740

AGCGGCCTCC CGAGCAAGTT CGGATGGGGG AAACTGAACA AAAAGGTCTC CTSTCTGCTG 1800

ATCAGTGTCT CATAGGGCAA GTCCTGAGGG ATCTGGGACA ACAGGTGGTG GACCGAGGCC 1860

ATGTCACAGT CACAGTCCAG GACTTCCTGC TCGCGATACA ACACAATCAC GGCTGCAAAG 1920

TAAATCGGCA TCAGTGGGTG GCAGGCCAGG AAGAAGTCAT ATAACCGCAC GACGTGCCTG 1980

AAGTCAGACA GGACATGCCC AAACCAGGTG ATGAGCCAGC TGAGGGCAAA GATGGTCCCT 2040

ACCTCAGCAC TCTGCATGAA GTCATGGAGC TCTGGATTCA CCTGGTCAAT GATGGGCATC 2100

AGATAGTTTA ATATATGC 2118

(2) INFORMATION FOR SEQ ID NO: 193:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1538 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 193:

CCGGGTTCGG CTCTGTGTCA GCAGCCGGGC GGCGCTCGGG CGGGACATGG CAGCCTGTAC 60

AGCCCGGCGG CCTGGCCGTG GGCAGCCGCT GGTGGTCCCG GTCGCTGACT GNGGCCCGGT 120

CGCCAAGGCC GCTCTGTGCG CGGCCGNAGC TGGAGCCTTC TCGCCAGCGT CGACCACGAC 180

GACGCGGAGG CACCTCTCGT CCCGAAACCG ACCAGAGGGC AAAGTGTTGG AGACAGTTGG 240

TGTGTTTGAG GTGCCAAAAC AGAATGGAAA ATATGAGACC GGGCAGCTTT TCCTTCATAG 300

CATTTTTGGC TACCGAGGTG TCGTCCTGTT TCCCTGGCAG GCCAGACTGT ATGACCGGGA 360

TGTGGCTTCT GCAGCTCCAG AAAAAGCAGA GAACCCTGCT GGCCATGGCT CCAAGGAGGT 420

GAAAGGCAAA ACTCACACTT ACTATCAGGT GCTGATTGAT GCTCGTGACT GCCCACATAT 480

ATCTCAGAGA TCTCAGACAG AAGCTGTGAC CTTCTTGGCT AACCATGATG ACAGTCGGGC 540

CCTCTATGCC ATCCCAGGCT TGGACTATGT CAGCCATGAA GACATCCTCC CCTACACCTC 600

CACTGATCAG GTTCCCATCC AACATGAACT CTTTGAAAGA TTTCTTCTGT ATGACCAGAC 660

AAAAGCACCT CCTTTTGTGG CTCGGGAGAC GCTAAGGGCC TGGCAAGAGA AGAATCACCC 720

CTGGCTGGAG CTCTCCGATG TTCATCGGGA AACAACTGAG AACATACGTG TCACTGTCAT 780

CCCCTTCTAC ATGGGCATGA GGGAAGCCCA GAATTCCCAC GTGTACTGGT GGCGCTACTG 840

TATCCGTTTG GAGAACCTTG ACAGTGATGT GGTACAGCTC CGGGAGCGGC ACTGGAGGAT 900

ATTCAGTCTC TCTGGCACCT TGGAGACAGT GCGAGGCCGA GGGGTAGTGG GCAGGGAACC 960

AGTGTTATCC AAGGAGCAGC CTGCGTTCCA GTATAGCAGC CACGTCTCGC TGCAGGCTTC 1020

CAGTGGGCAC ATGTGGGGCA CGTTCCGCTT TGAAAGACCT GATGGCTCCC ACTTTGATGT 1080

TCGGATTCCT CCCTTCTCCC TGGAAAGCAA TAAAGATGAG AAGACACCAC CCTCAGGCCT 1140

TCACTGGTAG GCCAGCTGAG GCCCCAAGTG CCCAGGCTTG GTCACCGGGA AGAACAACTC 1200

TCATCCCACA ATTGCTGCAG AACTCTTCTC TCCCCATCAT GGGCCACAGT GGGTCTCTTA 1260

ATTTGATTGT GGGGTTCTTT TTGTGGGGAG GGGTGGTATA ACTTTTCTTC AGAAGACCCA 1320

TGTGGGACAC CTCCAAGGCT GGCCTCCTCA TAAGCCCTGC CTACACCATG TTCCAGTAAA 1380

CCTCTCCACC AAGGAACTGT GTTCAGCTGC CACAGGCCTG GAGGAGTTTC CTGGCCTGTC 1440

ACGTGAGGTT TGATCAGTAA ACCAGTGCAS GYTTGGCCAA AAAAAAAAAA AAAAAAAAAA 1500

AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAACTCGA 1538

(2) INFORMATION FOR SEQ ID NO: 194:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 1098 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: double

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 194:

```
AGACCCTGTC TCAAATAATA ATAATAATAA TAATCTTATT TTGGAGAATA AAGAGACCTG      60
TGGATTTGAG GTGCCATTTG GGTAGAAAGA AAAGACGTTT ACACCGAGAA ATAGTCTGTG     120
TTGCCCTGAA GGAGCAGAGG GATGCATCGC TGGAGGTGAC CTACAGTTGA AGAAGACTCA     180
TTATGACAGA CCTTGTCCTT CTTCCTTGTG GAAAGTGTTT CCTCTGCTGC TACTGCTCAT     240
GAGACTCTTC CCCCTCCCTG TCCCAGGGAA CCAAAGGGCT TTNCTACCAC ACCCTTTCTT     300
NGCCCCCCGC CTCCCATGTC TGCTGTGCCT TTGTACTCAG CAATTCTTNG TTTGCTCCCA     360
TTATCTTCCA GCCGGATACA GAGTGAATAG TTAACCACAC TTAGGTCAAA TAGGATCTAA     420
ATTTTTGTTC CTGCTCCNGT GTAAAGAGGC CAGTGTTTGT GTGTTGCAAG CAGCCTTGGA     480
ATAGTAACTC TTCTCATTTG TTTGGGATCT GGCCAMCAAG TTCCAGAATG ATACACGGAT     540
CAGTGCAGAA GTTCATCAGG CTCTCGGACC TTAGGGCTGT TGGAGAAGGC TTCAGCAGCA     600
GAACTGATGG TKAWKGYTCG TGTTCTCCAT CCTCAACTTT CTTTGCTTCG ATCATACACA     660
AGAATACATT TGGAAGGGCA AAAAATGAAC ACTGTTGTTC ATTGCAGCCG TGTTTTGTGA     720
CACAGATGCA CAGTCTGCTG TGAAGACCTT CTCTCAAGTG GSATYTGGGA GTCCATGCCA     780
GATCATGGTG CTTCATGAGA GACTGACAGC TATCAGGGGT TGTGGCACTT AGTGAGGACT     840
CTCCTCCCCC AGTGTGTGCT GATGACACAT ACACACCTGA CAATAGCTTG AGTCTTCTCT     900
GTTCCTTTTA CTCTGTAGCC AACATACACA TGATTTAAAA CCCTTTCTAA ATATCTATCA     960
TGGTTCATCC TTGTCCAAAT GCAGAGTCAG AGCTATTTGT ACTTCATTAT TATTTCCAAG    1020
GCGAATAGTT GGCTTTCTTT TTGCAAAAAT AATTAAAGTT TTTGTATGTT GCAAAAAAAA    1080
AAAAAAAAAA CTACGTAG                                                  1098
```

(2) INFORMATION FOR SEQ ID NO: 195:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1001 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 195:

```
GAATTCGGCA CGAGATAGCT TGCATCTCAT CCCAGTAAAA CCACTTATTT ATAACATATC      60
AACGTATTGA CAAGGTTGAA GAGCAAGATT GTTCTGAGGT GAGATGCAAA TTTCAAAGGG     120
GTGAGCACTA ATTGTTCCAG TGATTGTTTA TTTATTGGCT AGGACATAAT TACTCTCTTT     180
GAGGTTACAC ATCTGCCTCC AGGTTCCTGT GTGCTTGTGC CCTTGGGATC AGGCCAGGGC     240
AGACTGTGAT CACTGAGATT CAAACTCCCA GARTAATCAG CAAGAGCTTT CTAGAGACCA     300
```

AGGCCAGGCC TGATCCCTGA GGGATGCATG AGAAGGCTTG GAATCTCATT CTGCTATGGT 360
GGCTCTCTCT TGATCTTCTT GGAGTAGCAA AAACAGCAAT GTGGGCCCAA TGGTGTGGCC 420
TAAATGATCA CAAAGGTAAA TGAGTAAAGG GCTCAGCAGA TGAGTAAGGA GCCTTGTCCT 480
GAGAAATTAG CACTGGGCTC TGCATTCAGA AACATGTGAT AAGCATTGCC CATTGCACAT 540
TGCCTTTATT GTGTAAGGAC ATGAAATTCC AGTTTTGCAT AGCTAGTGAT GAATACCTGA 600
AGGGAATTGC AGACATATTT TATTTTATTT TTAATTGACA GATGGAATTG TATATATTTA 660
TCATGTACAT AATCATGCTT TAAAATATGT ACATTATGGA ATGGCTAAAT CAAACTAACC 720
TAGGCATTAT CTCATATAAT TGTCATTTTT GTGGCGAGAA GACTAAAAAT CTACCCTTTC 780
AGCATTTTTA AAGAATACAA TGTGTTTTAT TAACAACAGT CACCATTTGG TACACTAGAT 840
CTCTTGAACT TCTTCCTCTT ATCTAACTGA GATCTTGTAA CCTTTGATAA CAGCTCCCAA 900
GCCCTTCCCC AACCACTGCT CCACCCGTGG TAACCACCAT TCTATTCTCA ACTTCCTGGT 960
AATCACCATT CTAGACACAG GGAAGACTCT CTACCCTCTG A 1001

(2) INFORMATION FOR SEQ ID NO: 196:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1443 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 196:

ATAAACTGAA ATAGGTCATG CAAATATAAA ATATTATTTT TAAATTATTT GTCATAAGAA 60
ACGATGGTGG CCATATTTTG CTTTAATAAT GGAAAAAATG TGGTTAGCAT TCTKTGGAAG 120
GTGGTCATCA GATAGTAGAC ATTTTCTAGG ATTTATTTCT ACCTGCATAT GTGGAAATGT 180
GTACTACTTT AGATTTATWT AATGGCAGCT AACTCAGAGG CATCAAAATG TGCTAATGGT 240
GTAATATGGC CTTTGTCTTG CTGTYCTGTT TTGTARGCCT TCAATCAAGC ARGGGCAGGG 300
CCGTACAGTG AACTTGTCCT TTGSCAGACG CCAGCGTCTG CCCCTGACCC CGTCTCCACT 360
CTCTGTGTCC TGGAGGAGGA GCCCCTTGAT GCYTACCCTG ATTCACCTTC TGCGTGCCTT 420
GTACTGAACT GGGAAGAGCC GTGCAATAAC GGATCTGAAA TCCTTGCTTA CACCATTGAT 480
CTAGGAGACA CTAGCATTAC CGTGGGCAAC ACCACCATGC ATGTTATGAA AGATCTCCTT 540
CCAGAAACCA CCTACCGGTG AGTGCAAGGG AGTAGAAATC TGCATCAGCA CATCAGCACT 600
TGGGGATCTA AGTAAACCTC TCGGGGAAAA TGACCAAGTG GATGTCATCT CCCAGCTGTT 660

TCTAAGAGCC CAGATGTCCA GAGTATTGTC TTACTTTGAT CCCTTAGCCC AGAAGACTTG 720

TGAAAAAGCC ACACTGGTTC AGGGACTCAC TGGACGGTTT TGTGTCCACT TTAACTTGCA 780

CCGTCTCTAC CCCAGAGTGG ACTCAAATCC TCAAGTCATC CTCTGAACAT TGAAGTCAGA 840

AATTATAAAA GGGCTTTGGC AATATGTTAG CCCAAAAATT TGGCTTCTTC CAGAAATTGT 900

GCCGACNTTA ACAGTGGCTT AAATGATGGT AAAACTTTTA AGATTTCTAA AAGGATGGCA 960

TTGGAGATAC GTTGACTTTT ATTAAACMAC CTATAGTTGT TTAATGATTT CTAAAAAAAT 1020

ATCTGGAGCT CAGGGGTTCA ACTGAGGGAA CACATGTTGA GAATCATTGT TTACTAATTA 1080

AATGCCAGGT AACCCGTTGA AATTATCAAA AACATTTTTC ACGTACCAGA AAGTACCTCA 1140

GAGGATAGTT CTGTTATGGA GAAGATGAAA TGGTTTAGTA GTGTAGGAAC TATGGAAAGG 1200

TGAGCTTAGA TTTGGATAGT AAAACCTCAA GACCCTATTT AAAAAGTATT TTATGAATGC 1260

AGCATAAATA ATTTAATTCA GTGTTAANAT GCCAAGGCTA GTATATTGAG CTGAATGTGA 1320

AAAGAAACTC ACATTGGGAG AATGCCACCT TTTCCTTATA AGATAGCTTT GAAGATACCA 1380

TTTTAGACAG ATGGAAATTG AATAGCTTTA GAAAAGGCAA ATGTTTGATC TTGGGGAAAA 1440

AAA 1443

(2) INFORMATION FOR SEQ ID NO: 197:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1282 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 197:

GAAAAAAAAA AGTATGACCC AGTAGCTAGG CACCTGTGGC CCCGCCAAGT TGACACATAA 60

AATTAACTGT CACAGTATCA TCTTAGAAGT GAAAGAAGCC CCTTTATCCT GCAGTGCCCC 120

TCTACCACCA CCTACTGACA AAGAACATGG TGCTATCTGG CATGGGAGAA ATGTTCAGTT 180

TGCTATGGCT TGTATGTGTC CCCTCAAATT CAAGTGTTGC CAATGTGACA GCATCAAGAG 240

GTGGGGTCTT TAAGAGATCA CTAGGCCATG AGGGATTCTC TTAGGACTGG GATGAAGGCC 300

CATAATAAAA GAGGTTTCAG GGAGCATCCT GCTAGCTTGC CTTCTGTATG TGAGAACACA 360

GCAAGAAAGC CCTAGTCAAC AAGTGCCAGC TCCTTGATCT TAGACTTCCC ATCCTCCAGA 420

ACTGTGAGAA ATACATTTCT GTTCCTTACA AATTACCCAG TCTCCTGTAT TCTGTTATAG 480

CAGCACAAAA TGAAGATACC ATACCTGAAC ACCTGAACAT TCTTCACAAG GTAGTAAATG 540

CACTGCTTTA TTCTGGTCTC AGTATTGTGT GCTTAATAAG GAAATGAGAA AGGGTGGATC 600

AGGGCATAGG ATGAACAAGT TACTGCTAGA CCTCTCACAA TGCCACTAAT GGATAAGATT 660

GTATTTTCAT CATTNCTTGT CTCTTCGGAA GCTAACACCA TGCTATAATA GGCATTAAAT 720

AGATGTCTAA AAACACCTTA AGTATTTGTC TAGAAATCTG GTGCATTGTC CAGAAAGAAC 780

CAAAATTCMA AATAATTTCA AAGGGCCTAA AGCACTAATT AATCCAAATT CATTAGTTTT 840

TAATGGTACT ACCACTCTCA AATTTAAAAT GTCATCTTAC GTTCCTCTTC CTCGAATTGG 900

ATTTATTGCT AAAACCTGGT AAACAGTTTA ATCCATTTCA ATTCCATTAC CATTGCTCTT 960

GTCCAGAATT ACTCGCAGAC TAATAGTCAC CTGACTTCTT CCCCTGCATC CCGATTTGCT 1020

GTCTAATTCT GGTTACAAAT AAGTAACTGC CAAACTAATC TTTCTAAAAA GTAAGACTGA 1080

TCTCGTCACT CCTTTGCTCA ACAATGTAAA AGCTCCCATT GTCTCCCAAA TAAAACCAGC 1140

TTTCCACTGT GTATACAATA CATCCATGAT CTGTATCCAG CATCATTTTG TATTTGCTCA 1200

CTTTATACAC CACCCCCCAT GCCACATCAA ATTAAATTAT CCTGATAAAT GCAATTGCAA 1260

AAAAAAAAAA AAAAAAACTC GA 1282

(2) INFORMATION FOR SEQ ID NO: 198:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 951 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 198:

ATTTCGGAAC GAGGACTGAA GTGGGACCGG CGGCAGGGTA GAAGACAGAA GGGGATCTA 60

TGTGGTAACT AAAGAATGTT TCTGTTTTGT TAATTATTGT GTGTGTGTGG TTTTATTGTT 120

TGCTTAAGAG AATCAAAAAC TGAAAAAAAT GAGAATACAG GAAATGGCTC TTGTTTATTT 180

TTTTGCTGTG TTTACAGCTT GTTAATGCTC TACTGTCTTT GTTTCAAGAG AGATTTGTTC 240

ACTGCCCAGC TCGTTTTGTG TCCTGAGCCC TATGCCCAGC CCACCTTATA AATCATGCCT 300

GTTTAGATGT TTGATTTTGT TCTGTTTGCT ATTGTTATCT TAAGGTGTA TAACTCTGAC 360

ATGCCAGACA TCAAATTAAG CTCAAATTAA GCTCTCGTTT AAATGTTTAA ACACCTAATT 420

TATATTCTAA TTGATCCCAG CCACTGATGC ATGTACTTTA GCTACTTCTG CTAAATAAGC 480

ATATTAATTT TCCACATCAG GCCATCAGAT CTTGAGAACC AACAGTTATC TAGAATTCCG 540

TGTCTACTAA TGTTTCACCT GCATGCAGCC TTCATTAATT TTGTAGCAAA ATATAAAGTG 600

ATCATTATGT AGTTTCTGGA TTAAAAAAAT TTGTGTGTGA AGTTGCTTTG TAAAGTGCAT 660

GTGGAATTAA TGGGACAGTG TGCCCTTTGT GTTAGATGTT AGAGCAAAAG AAAGGGCTTA 720

TAGTGTTAGT ATTGGAGCAC TTTGAAGATA GATATTTTCA GAAAAGATGT AGGATTTAAA 780

AGTTAAATTT TAAATTTTAG AAAAAGATAT GATGGCAATT GGAAATACTC ACAATGAAGT 840

TCTTCATCCA GTAGGTGTTT AACAGTGTTA TTTTGCCACT GGTAATGTGT AAACTGTGAG 900

TGATTTACAA TAAATGATTA TGAATTCAAA AAAAAAAAAA AAAAAACTCG A 951

(2) INFORMATION FOR SEQ ID NO: 199:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1740 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 199:

TTATTATAAT AATGATGATG ATTGCAAGGA AAAAACCTAC AGCGAATGTT CCATTTCTAC 60

CCGGCACGCA GACACTCTCC CTAACACTGA TAACCTGAGC CCCCAGCACT GGACGGAAGA 120

ATGCTGGCGT CTCCGTGTGT ACTGGTTCAG GGTTCTGGCC CCAGCCTTGT CAGGACCCCC 130

TGGTGTCCAG AGCCCCCACC CCTCCCGCAA CAAGCAGCTG ATGCCCCAGT GATTCTCTAT 240

ACATTTTTCA CCTCGGCCAA TATGTCCAGG AAAACTGCTT ACTTCTCTTT TCTTGCCTGG 300

AGCCTTCATT GTTCACCCTT ACGTTGCAAT ATAGGAATTA ATGCTACAAA ATAAAAGTAA 360

AGCTTACCTG AAAAGTGCAT AGTTTGGGGC AATGGTATCT ACATCTCCCA CTGTGGGAAA 420

ACCAGCAAAG CATCAAAACT CTCAATTCTC CTGTTACCPA ATGCAGATCT GAATTATAAG 480

ATGTTTATGT TTGACCATTG TTTCAACAAT GGGATTTTGT TACGAATTAT CCCTTTAACT 540

GAAACCCTCA GTTTTACTGT TTACATTATT AGGAAAACAG GGATATCTTT TGAATCTAAA 600

AATTTGATGT ACAGCATGTG ATTTTTGAAG TTTACATGTA AAGTCACAGT ATAGGTGAAA 660

TAACGTTTGT CATATTTTGA GACGTATCCT GCAGCCATGT TTTTACGTGA GTGTTTTAGT 720

CAAAGTACAT GGTAGACAGT CTTTCACAAT AAAAGGAAAA GGATTTTTTT TCCTCCAAAT 780

GTACATTTAT CAACCTAATG ATTGATTTTT TTAAAAAGAG ATTTCGCCCC AGTCTGGTTT 840

ATGAAAGTTC ATTGCCCTAA ACTGTGCTGA TTGTTTTTAA TCAAGTTATA AATTTCCAAC 900

CTAGATCATG TATCTACCAA CTCTCCTGCA TTTTCCAAAA GGCATTGAGC TTAAATATTA 960

GTCTTGCTTA GAGTAGGTTA TCCACTTACA TGCTGCGCTA AAGCCATGCC TTTGAAACTC 1020

CTTGTTTAAA ACATGATATG ATTTTTGTGG GCAGTTTCAG AAAAGAAAAC AAACAAACAA 1080

AAATCGACCC TTTAATTATT ACTTGCAACT CAACAGATCT CCCTGCCGTA CTGCCTTTTC 1140

CAGGAACTTT ACTTCAGGGC TGTCCAGATT GCAGTTGTGC CCCGTGTATG TGGATCTAGT 1200

TCACAGAGTC TTTGGAAGCC AGCAGTCGTG CCCTCCGTAT ACTGTCCACT CATTTTATGT 1260

AGATTTGGTA TCCTCAGCAG CCAGTGTTAA CACCACTGTC ACGTAGTTAN CAGATTCATC 1320

TTTTATGTAT TTAAAGTAAT CCATACTATG ATTTGGTTTT TCCCTGCACC ATTAATTCTG 1380

GCATCAGATC AGTTTTTGTG TTGTGAAGTT CTACTGTGGT TTGACCCAAG ACCACAACCA 1440

TGAGACCCTG AAGTAAAGAT AAGGTACACA TACATTATTT GAGTAACTGT TTCCTTGGGG 1500

GCCAATCTGT GTATGCTTTT AGAAGTTTAC AGAATGCTTT TATTTTTGTC TATAACAAAC 1560

AGTCTGTCAT TTATTTCTGT TGATAAACCA TTTGGACAGA GTGAGGACGT TTGCCCTGTT 1620

ATCTCCTAGT GCTAACAATA CACTCCAGTC ATGAGCCGGG CTTTACAAAT AAAGCACTTT 1680

TGATGACTCA MAAAAAAAAA AAAAAAAAMC YCGGGGGGGG GCCGGTAACC CATTTNNCCC 1740

(2) INFORMATION FOR SEQ ID NO: 200:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1707 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 200:

GCTTATAGAA GGGAGAGGAG CGAACATGGC AGCGCGTTGG CGGTTTTGGT GTGTCTCTGT 60

GACCATGGTG GTGGCGCTGC TCATCGTTTG CGACGTTCCC TCAGCCTCTG CCCAAAGAAA 120

GAAGGAGATG GTGTTATCTG AAAAGGTTAG TCAGCTGATG GAATGGACTA ACAAAAGACC 180

TGTAATAAGA ATGAATGGAG ACAAGTTCCG TCGCCTTGTG AAAGCCCCAC CGAGAAATTA 240

CTCCGTTATC GTCATGTTCA CTGCTCTCCA ACTGCATAGA CAGTGTGTCG TTTGCAAGCA 300

AGCTGATGAA GAATTCCAGA TCCTGGCAAA CTCCTGGCGA TACTCCAGTG CATTCACCAA 360

CAGGATATTT TTTGCCATGG TGGATTTTGA TGAAGGCTCT GATGTATTTC AGATGCTAAA 420

CATGAATTCA GCTCCAACTT TCATCAACTT TCCTGCAAAA GGGAAACCCA AACGGGGTGA 480

TACATATGAG TTACAGGTGC GGGGTTTTTC AGCTGAGCAG ATTGCCCGGT GGATCGCCGA 540

CAGAACTGAT GTCAATATTA GAGTGATTAG ACCCCCAAAT TATGCTGGTC CCCTTATGTT 600

GGGATTGCTT TTGGCTGTTA TTGGTGGACT TGTGTATCTT CGAAGAGTAA TATGGAATTT 660

CTCTTTAATA AAACTGGATG GGCTTTTGCA GCTTTGTGTT TTGTGCTTGC TATGACATCT 720

GGTCAAATGT GGAACCATAT AAGAGGACCA CCATATGCCC ATAAGAATCC CCACACGGGA 780

CATGTGAATT ATATCCATGG AAGCAGTCAA GCCCAGTTTG TAGCTGAAAC ACACATTGTT 840

CTTCTGTTTA ATGGTGGAGT TACCTTAGGA ATGGTGCTTT TATGTGAAGC TGCTACCTCT 900

GACATGGATA TTGGAAAGCG AAAGATAATG TGTGTGGCTG GTATTGGACT TGTTGTATTA 960

TTCTTCAGTT GGATGCTCTC TATTTTTAGA TCTAAATATC ATGGCTACCC ATACAGCTTT 1020

CTGATGAGTT AAAAAGGTCC CAGAGATATA TAGACACTGG AGTACTGGAA ATTGAAAAAC 1080

GAAAATCGTG TGTGTTTGAA AAGAAGAATG CAACTTGTAT ATTTTGTATT ACCTCTTTTT 1140

TTCAAGTGAT TTAAATAGTT AATCATTTAA CCAAAGAAGA TGTGTAGTGC CTTAACAAGC 1200

AATCCTCTGT CAAAATCTGA GGTATTTGAA AATAATTATC CTCTTAACCT TCTCTTCCCA 1260

GTGAACTTTA TGGAACATTT AATTTAGTAC AATTAAGTAT ATTATAAAAA TTGTAAAACT 1320

ACTACTTTGT TTTAGTTAGA ACAAAGCTCA AAACTACTTT AGTTAACTTG GTCATCTGAT 1380

TTTATATTGC CTTATCCAAA GATGGGGAAA GTAAGTCCTG ACCAGGTGTT CCCACATATG 1440

CCTGTTACAG ATAACTACAT TAGGAATTCA TTCTTAGCTT CTTCATCTTT GTGTGGATGT 1500

GTATACTTTA CGCATCTTTC CTTTTGAGTA GAGAAATTAT GTGTGTCATG TGGTCTTCTG 1560

AAAATGGAAC ACCATTCTTC AGAGCACACG TCTAGCCCTC AGCAAGACAG TTGTTTCTCC 1620

TCCTCCTTGC ATATTTCCTA CTGAAATACA GTGCTGTCTA TGATTGTTTT TGTTTTGTTG 1680

TTTTTTYGAG ATCACGYTAC TGGCTC 1707

(2) INFORMATION FOR SEQ ID NO: 201:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 779 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: double

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 201:

CTGTCCCCAG TGTTTCCAGG TAATGACTTG GCACTCCAGA GAAAGTTTCA TRCTGTTGCG 60

TGTGGTGGCT CCAAGCCAAG CACCTGGCAT GCAGGTCAGC CCTTCCCAGC GGGCGTGGCG 120

TCGTCCTCTT CACAGATGCC ACGTTGCAGC CCCAAGGCCT CACCATTTTG CGTTTTTTAG 180

AAACCCATTT TCTTGGTCAT TTATAAAGCT GCTTTATAGA TATCTTTGAT CCTGGCATGC 240

CTTGGTTTCC TCTCCCTTCC CTCTTTCCAA TCCTGGTTTC CTAACCTCCT CTTGTAGTAA 300

TTCTCAACTC AACTCAAAGT CCCAAGAATT TGGAATGGTA GGATGCTGTG CGGGGAGCTC 360

GAGGCTGAGG CATAATCACT GCTTCGGTTC TGCTCATCAG GGGACACGCT CCCTTACTCA 420

TGGCAGCCAT GTTTGATTGT CACAGAGCCC CCCGAATACT CTGTCTATAG TGACACACTG 480

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TAGGTGTCAT AAATTTTAAG AAACCTGCTT TTAAGTACTA TTTATAGGTT TTTCTGTTAT    540
ACTTGCAACC TAGTTTTAAA ATACATGAGG ATTTTATGAA AGCTTTATAC AGACATTTAT    600
AGGAAACTCA TTCTTTGATT TTAGGTGCCA TTTAAATTGA TAACACTTAC TTTATAAAAA    660
GATGCTTTTT GTCTGGATAG AGCCTTATAG TTTAAAATAT CTTCATATAT TGCCATTTGA    720
TCAAATAAAT TTCTTACTTA GAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAACTCGA     779
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(2) INFORMATION FOR SEQ ID NO: 202:

(i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 1617 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 202:

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GGCACAGCTT TCTGTCTCTT CCTCGCTCCC TCTCTTTCTC TCCTCCCTCT GCCTTCCCAG     60
TGCATAAAGT CTCTGTCGCT CCCGGAACTT GTTGGCAATG CCTATTTTTT GGCTTTCCCC    120
CGCGTTCTCT AAACTAACTA TTTAAAGGTC TGCGGTCGCA AATGGTTTGA CTAAACGTAG    180
GATGGGACTT AAGTTGAACG GCAGATATAT TTCACTGATC CTCGCGGTGC AAATAGCGTA    240
TCTGGTGCAG GCCGTGAGAG CAGCGGGCAA GTGCGATGCG GTCTTCAAGG GCTTTTCGGA    300
CTGTTTGCTC AAGCTGGGCG ACACATGGCC AACTACCCGC AGCCTGGGAC GACAAGACGA    360
ACATCAAGAC CGTGTGCACA TACTGGGAGG ATTTCCACAG CTGCACGGTC ACAGCCCTTA    420
CGGATTGCCA GGAAGGGGCG AAAGATATGT GGGATAAACT GAGAAAAGAA TCCAAAAACC    480
TCAACATCCA AGGCAGCTTA TTCGAACTCT GCGGCAGCGG CAACGGGGCG GCGGGGTCCC    540
TGCTCCCGGC GTTCCCGGTG CTCCTGGTGT CTCTCTCGGC AGCTTTAGCG ACCTGGCTTT    600
CCTTCTGAGC GTGGGGCCAG CTCCCCCCGC GCGCCCACCC ACACTCACTC CATGCTCCCG    660
GAAATCGAGA GGAAGATCCA TTAGTTCTTT GGGGACGTTG TGATTCTCTG TGATGCTGAA    720
AACACTCATA TAGGATTGTG GGAAATCCTG ATTCTCTTTT TTATTTCGTT TGATTTCTTG    780
TGTTTTATTT GCCAAATGTT ACCAATCAGT GAGCAAGCAA GCACAGCCAA AATCGGACCT    840
CAGCTTTAGT CCGTCTTCAC ACACAAATAA GAAAACGGCA AACCCACCCC ATTTTTTAAT    900
TTTATTATTA TTAATTTTTT TTGTTGGCAA AAGAATCTCA GGAACGGCCC TGGGCACCTA    960
CTATATTAAT CATGCTAGTA ACATGAAAAA TGATGGGCTC CTCCTAATAG GAAGGCGAGG    1020
AGAGGAGAAG GCCAGGGGAA TGAATTCAAG AGAGATGTCC ACGGACGAAA CATACGGTGA    1080
```

ATAATTCACG CTCACGTCGT TCTTCCACAG TATCTTGTTT TGATCATTTC CACTGCACAT 1140

TTCTCCTCAA GAAAAGCGAA AGGACAGACT GTTGGCTTTG TGTTTGGAGG ATAGGAGGGA 1200

GAGAGGGAAG GGGCTGAGGA AATCTCTGGG GTAAGAGTAA AGGCTTCCAG AAGACATGCT 1260

GCTATGGTCA CTGAGGGGTT AGCTTTATCT GCTGTTGTTG ATGCATCCGT CCAAGTTCAC 1320

TGCCTTTATT TTCCCTCCTC CCTCTTGTTT TAGCTGTTAC ACACACAGTA ATACCTGAAT 1380

ATCCAACGGT ATAGATCACA AGGGGGGGAT GTTAAATGTT AATCTAAAAT ATAGCTAAAA 1440

AAAGATTTTG ACATAAAAGA GCCTTGATTT TAAAAAAAAA AGAGAGAGAG ATGTAATTTA 1500

AAAAGTTTAT TATAAATTAA ATTCAGCAAA AAAAGATTTG CTACAAAGTA TAGAGAAGTA 1560

TAAAATAAAA GTTATTGTTT GAAAAAAAAA AAAAAAAAAW CTCGACCGCA AGGGAAT 1617

(2) INFORMATION FOR SEQ ID NO: 203:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1974 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 203:

GAATTCGGCA CGAGGCTGAG GGAGCTGCAG CGCAGCAGAG TATCTGACGG CGCCAGGTTG 60

CGTAGGTGCG GCACGAGGAG TTTTCCCGGC AGCGAGGAGG TCCTGAGCAG CATGGCCCGG 120

AGGAGCGCCT TCCCTGCCGC CGCGCTCTGG CTCTGGAGCA TCCTCCTGTG CCTGCTGGCA 180

CTGCGGGCGG AGGCCGGGCC GCCGCAGGAG GAGAGCCTGT ACCTATGGAT CGATGCTCAC 240

CAGGCAAGAG TACTCATAGG ATTTGAAGAA GATATCCTGA TTGTTTCAGA GGGGAAAATG 300

GCACCTTTTA CACATGATTT CAGAAAAGCG CAACAGAGAA TGCCAGCTAT TCCTGTCAAT 360

ATCCATTCCA TGAATTTTAC CTGGCAAGCT GCAGGGCAGG CAGAATACTT CTATGAATTC 420

CTGTCCTTGC GCTCCCTGGA TAAAGGCATC ATGGCAGATC CAACCGTCAA TGTCCCTCTG 480

CTGGGAACAG TGCCTCACAA GGCATCAGTT GTTCAAGTTG GTTTCCCATG TCTTGGAAAA 540

CAGGATGGGG TGGCAGCATT TGAAGTGGAT GTGATTGTTA TGAATTCTGA AGGCAACACC 600

ATTCTCCAAA CACCTCAAAA TGCTATCTTC TTTAAAACAT GTCAACAAGC TGAGTGCCCA 660

GGCGGGTGCC GAAATGGAGG CTTTTGTAAT GAAAGACGCA TCTGCGAGTG TCCTGATGGG 720

TTCCACGGAC CTCACTGTGA GAAAGCCCTT TGTACCCCAC GATGTATGAA TGGTGGACTT 780

TGTGTGACTC CTGGTTTCTG CATCTGCCCA CCTGGATTCT ATGGAGTGAA CTGTGACAAA 840

GCAAACTGCT CAACCACCTG CTTTAATGGA GGGACCTGTT TCTACCCTGG AAAATGTATT 900

TSCCCTCCAG GACTAGAGCG AGAGCAGTGT GAAATCAGCA AATGCCCACA ACCCTGTCGA 960

AATGGAGGTA AATGCATTGG TAAAAGCAAA TGTAAGTKTT CCAAAGGTTA CCAGGGAGAC 1020

CTCTGTTCAA AGCCTGTCTG CGAGCCTGGC TGTGGTGCAC ATGGAACCTG CCATGAACCC 1080

AACAAATGCC AATGTCAAGA AGGTTGGCAT GGAAGACACT GCAATAAAAG GTACGAAGCC 1140

AGCCTCATAC ATGCCCTGAG GCCAGCAGGC GCCCAGCTCA GGCAGCACAC GCCTTCACTT 1200

AAAAAGGCCG AGGAGCGGCG GGATCCACCT GAATCCAATT ACATCTGGTG AACTCCGACA 1260

TCTGAAACGT TTTAAGTTAC ACCAAGTTCA TAGCCTTTGT TAACCTTTCA TGTGTTGAAT 1320

GTTCAAATAA TGTTCATTAC ACTTAAGAAT ACTGGCCTGA ATTTTATTAG CTTCATTATA 1380

AATCACTGAG CTGATATTTA CTCTTCCTTT TAAGTTTTCT AAGTACGTCT GTAGCATGAT 1440

GGTATAGATT TTCTTGTTTC AGTGCTTTGG GACAGATTTT ATATTATGTC AATTGATCAG 1500

GTTAAAATTT TCAGTGTGTA GTTGGCAGAT ATTTTCAAAA TTACAATGCA TTTATGGTGT 1560

CTGGGGGCAG GGGAACATCA GAAAGGTTAA ATTGGGCAAA AATGCGTAAG TCACAAGAAT 1620

TTGGATGGTG CAGTTAATGT TGAAGTTACA GCATTTCAGA TTTTATTGTC AGATATTTAG 1680

ATGTTTGTTA CATTTTTAAA AATTGCTCTT AATTTTTAAA CTCTCAATAC AATATATTTT 1740

GACCTTACCA TTATTCCAGA GATTCAGTAT TAAAAAAAAA AAAATTACAC TGTGGTAGTG 1800

GCATTTAAAC AATATAATAT ATTCTAAACA CAATGAAATA GGGAATATAA TGTATGAACT 1860

TTTTGCATTG GCTTGAAGCA ATATAATATA TTGTAAACAA AACACAGCTC TTACCTAATA 1920

AACATTTTAT ACTGTTTGTA TGTATAAAAT AAAGGTGCTG CTTTAGTTTT CTGA 1974

(2) INFORMATION FOR SEQ ID NO: 204:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 1057 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: double

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 204:

CGGCCTTCCG GGGCAACCGT TCGTCCCAAC NCGGGAAAGG GTCCTGGAGN CGGGAACTAG 60

GAGCCTCGGA AGTCCAAGGG CGGAGCGCCC TTTGCTAATA AGCCAATCAG AACGTGAGAC 120

GCTCCGGTGG GNCGGTGCCG TCGAGCGCGG GGTGGAGTCT GGGTGACTTG GCTGGCGGGA 180

TCAAGTGCAG CTGCTTCAGG CTGAGGTGGC AGATAGTGAG CGCTGGTGGC GGAGTTAAAG 240

TYAAAGCAGG AGAGTAATWA TGAATAGCGC AGCGGGATTC TCACACCTAG ACCGTCGCGA 300

GCGGGTTCTC AAGTTAGGGG AGAGTTTCGA GAAGCAGCCG CGCTGCGCTT CCACACTGTG 360

CGCTATGACT TCAAACCTGC TTCTATTGAC ACTTCTTCTG AAGGATACCT TGAGKTTGGC 420

GAAGKTGAAC AGKTGACCAT WACTCTGCCM AATATAGAAA GTTGAAGGAA GCAGTAAAAT 480

TCAGTATCGT AAAGAACAAC AGCAACAACA ATGTGGAATT CASCCAGGAC TCCCAATCTT 540

GTAAAACATT CTCCATCTGA AGATAAGATG TCCCCAGCAT CTCCAATAGA TGATATCGAA 600

AGAGAACTGA AGGCAGAAGC TAGTCTAATG GACCAGATGA GTAGTTGTGA TAGTTCATCA 660

GATTCCAAAA GTTCATCATC TTCAAGTAGT GAGGATAGTT CTAGTGACTC AGAAGATGAA 720

GATTGCAAAT CCTCTACTTC TGATACAGGG NAATTGTGTC TCAGGACATC CTACCATGAC 780

ACAGTACAGG ATTCCTGATA TAGATGCCAG TCATAATAGA TTTCGAGACA ACAGTGGCCT 840

TCTGATGAAT ACTTTAAGAA ATGATTTGCA GCTGAGTGAA TCAGGAAGTG ACAGTGATGA 900

CTGAAGAAAT ATTTAGCTAT AAATAAAAAT TTATACAGCA TGTATAATTT ATTTTGTATT 960

AACAATAAAA ATTCCTAAGA CTGAGGGAAA TATGTCTTAA CTTTTGATGA TAAAAGAAAT 1020

TAAATTTGAT TCAGAAAAAA AAAAAAAAAA AACTCGA 1057

(2) INFORMATION FOR SEQ ID NO: 205:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 721 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 205:

GAATTCGGCA CGAGTCATCC CTCTCCCTCT TTCACTGCCT TACTCTTACT CTGTTTTTTG 60

TGCTCCAGAC AGACAGACCC TACCTCTTTT GCTTCTTTTT TGTTTGTTTG TTTTGAGATG 120

GAGTGTCGCT CTTGTTGCCC AGGCTGGAGT GCAGTGGCGC AATCTCGGCT CACCACAACC 180

TCTGCCTCCC GGGTTCAAGC AATTCTCCTG CCTCAGCCTC CCGAGAAGCT GGGGATTACA 240

GGCATGCGCC ACCACACCCA GCTNAATTTT ATATTTTTAG TAGAGATGGT GTTTCTCCAT 300

GTTGGTCAGG CTGGCCTCAA ACTCCCAACC TCAGGTGATN CCGCCTGCTT TGGCCTCCCC 360

AAAGTGCTGG GATTACAGGC GTGAGCCACT GCGCCCAGCC TCTTTTGCTC CTTTATACTC 420

ATTAACTCAC GCCTGTAATC CCTGTTTTGG GAGGCCAAAG TGAGAAGGTT GCTTGAGGCC 480

AAGAGTTTGA GACTAGCCTG GGCAACACAG CAAGATGCCA TCTTTATAAT AAAAATAAAA 540

ATAAAAATCA ATTAGCTGGG CATGGTGGAA CGCACCTGTA GTCCCAGCCA ATTGAGAGGC 600

TGAAGTGGGA GGATCATTGA GCCCAGGAGT TGAGGTTGCA GTGAGCCATG ATCATGTCAC 660

TACACTCAGC CTGGGCAATA GAGGGACATG TTGTCTCTAA AAAAAAAAA AAAAAACTCG 720

A 721

(2) INFORMATION FOR SEQ ID NO: 206:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2465 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 206:

CCACCATTTA TCCAACTGAA GAGGAGTTAC AGGCAGTTCA GAAAATTGTT TCTATTACTG 60

AACGTGCTTT AAAACTCGTT TCAGACAGTT TGTCTGAACA TGAGAAGAAC AAGAACAAAG 120

AGGGAGATGA TAAGAAAGAG GGAGGTAAAG ACAGAGCTTT GAAAGGAGTT TTGCGAGTGG 180

GAGTATTGGC AAAAGGATTA CTTCTCCGAG GAGATAGAAA TGTCAACCTT GTTTTGCTGT 240

GCTCAGAGAA ACCTTCAAAG ACATTATTAA GCCGTATTGC AGAAAACCTA CCCAAACAGC 300

TTGCTGTTAT AAGCCCTGAG AAGTATGACA TAAAATGTGC TGTATCTGAA GCGGCAATAA 360

TTTTGAATTC ATGTGTGGAA CCCAAAATGC AAGTCACTAT CACACTGACA TCTCCAATTA 420

TTCGAGAAGA GAACATGAGG GAAGGAGATG TAACCTCGGG TATGGTGAAA GACCCACCGG 480

ACGTCTTGGA CAGGCAAAAA TGCCTTGACG CTCTGGCTGC TCTACGCCAC GCTAAGTGGT 540

TCCAGGCTAG AGCTAATGGT CTGCAGTCCT GTGTGATTAT CATACGCATT CTTCGAGACC 600

TCTGTCAGCG AGTTCCAACT TGGTCTGATT TTCCAAGCTG GGCTATGGAG TTACTAGTAG 660

AGAAAGCAAT CAGCAGTGCT TCTAGCCCTC AGAGCCCTGG GGATGCACTG AGAAGAGTTT 720

TTGAATGCAT TTCTTCAGGG ATTATTCTTA AAGGTAGTCC TGGACTTCTG GATCCTTGTG 780

AAAAGGATCC CTTTGATACC TTGGCAACAA TGACTGACCA GCAGCGTGAA GACATCACAT 840

CCAGTGCACA GTTTGCATTG AGACTCCTTG CATTCCGCCA GATACACAAA GTTCTAGGCA 900

TGGATCCATT ACCGCAAATG AGCCAACGTT TTAACATCCA CAACAACAGG AAACGAAGAA 960

GAGATAGTGA TGGAGTTGAT GGATTTGAAG CTGAGGGGAA AAAAGACAAA AAAGATTATG 1020

ATAACTTTTA AAAAGTGTCT GTAAATCTTC AGTGTTAAAA AAACAGATGC CCATTTGTTG 1080

GCTGTTTTTC ATTCATAATA ATGTCTACAT TGAAAAATTT ATCAAGAATT TAAAGGATTT 1140

CATGGAAGAA CCAAGTTTTT CTATGATATT AAAAAATGTA CAGTGTTAGG TATTATTTGA 1200

ATGGAAAGAC ACCCAAAAAA AAAAATGTGC TCCGACTAGG GGGAAAACAG TAGTTCCGAT 1260

TTTTTCCCAT TATTTTTATT TTATTTTCTG GTTGCCCTAG CTTCCCCCCC TATTTTTGTG 1320

TCTTTTATTA ACTAGTGCAT TGTCTTATTA AATCTTCACT GTATTTAATG CAGGATGTGT 1380

GCTTCAGTTG CTCTGTGTAT TTTGATATTT TAATTTAGAG GTTTTGTTTG CTTTTTGACA 1440

CTAGTTGTAA GTTACTTTGT TATAGATGGT ATCCTTTACC CCTTCTTAAT ATTTTACAGC 1500

AGTACGTTTT TTTGTAACGT GAGACTGCAG AGTTTGTTTT TCTATATGTG AAGGATTACA 1560

ACACAAAAAG TTATCCTGCC ATTCGAGTGC TCAGAACTGA ATGTTTCTGC AGATCTTGTG 1620

GCATTTGTCT CTAGTGTGAT ATATAAAGGT GTAATTAAGA CAGAGTTCTG TTAATCTAAT 1680

CAAGTTTGCT GTTAGTTGTG CATTAGCAGT ATAAAAGCTA ATATATACTA TATGGTCTTG 1740

CAACAGTTTT AAAGCCTCTG CATAATTGAT AATAAAAATG CATGACATTC TTGTTTTTAA 1800

TAGACTTTTA AAATCATAAT TTTAGGTTTA ACACGTAGAT CTTTGTACAG TTGACTTTTT 1860

GACATAGCAA GGCCAAAAAT AACTTTCTGA ATATTTTTTT CTTGTGTATA AGTGGAAAGG 1920

GCATTTTTCA CATATAAGTG GGCTAACCAA TATTTTCAAA AGAACTTCAT CATTGTACAA 1980

CTAACAACAG TAACTAGCCC TTAATTATGG TGACAGTTCC TTATTGGTGT GTGTGAGATT 2040

ACTCTAGCAA CTATTACAGT ATAACACAGA TGATCTTCTC CACACACCCC ATCACCCAGA 2100

TAATTTACAG TTCTGTTAAC AGTGAGGTTG ATAAAGTATT ACTGATAAAA AATTATCTAA 2160

GGAAAAAAAC AGAAAATTAT TTGGTGTGGC CATCTTACCT GCTTATGTCT CCTACACAAA 2220

GCTAAATATT CTAGCAGTGA TGTAATGAAA AATTACATCT TACTGTTGAT ATATGTATGC 2280

TCTGGTACAC AGATGTCATT TTGTTGTCAC AGCACTACAG TGAAATACAC AAAAAATGAA 2340

ATTCATATAA TGACTTAAAT GTATTATATG TTAGAATTGA CAACATAAAC TACTTTTGCT 2400

TTGAAATGAT GTATGCTTCA GTAAAATCAT ATTCAAATTT AAAAAAAAAA AAAAAAAAAA 2460

CTCGA 2465

(2) INFORMATION FOR SEQ ID NO: 207:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 1480 base pairs

(B) TYPE: nucleic acid

(C) STRANDEDNESS: double

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 207:

GAATTCGGCA CGAGCTCAAG CTGGCAGGTG GTCGGGGGAG CGGCCGGAGA GGAGCTGCCG 60

GGAGTTCGTG CCCTGCAGGA CATGACACCA GTGGCATATC ACGGCCATGG GGTCTCAGCA 120

TTCCGCTGCT GCTCGCCCCT CCTCCTGCAG GCGAAAGCAA GAAGATGACA GGGACGGTTT 180

GCTGGCTGAA CGAGAGCAGG AAGAAGCCAT TGCTCAGTTC CCATATGTGG AATTCACCGG 240
GAGAGATAGC ATCACCTGTC TCACGTGCCA GGGGACAGGC TACATTCCAA CAGAGCAAGT 300
AAATGAGTTG GTGGCTTTGA TCCCACACAG TGATCAGAGA TTGCGCCCTC AGCGAACTAA 360
GCAATATGTC CTCCTGTCCA TCCTGCTTTG TCTCCTGGCA TCTGGTTTGG TGGTTTTCTT 420
CCTGTTTCCG CATTCAGTCC TTGTGGATGA TGACGGCATC AAAGTGGTGA AAGTCACATT 480
TAATAAGCAA GACTCCCTTG TAATTCTCAC CATCATGGCC ACCCTGAAAA TCAGGAACTC 540
CAACTTCTAC ACGGTGGCAG TGACCAGCCT GTCCAGCCAG ATTCAGTACA TGAACACAGT 600
GGTGAATTTT ACCGGGAAGG CCGAGATGGG AGGACCGTTT TCCTATGTGT ACTTCTTCTG 660
CACGGTACCT GAGATCCTGG TGCACAACAT AGTGATCTTC ATGCGAACTT CAGTGAAGAT 720
TTCATACATT GGCCTCATGA CCCAGAGCTC CTTGGAGACA CATCACTATG TGGATTGTGG 780
AGGAAATTCC ACAGCTATTT AACAACTGCT ATTGGTTCTT CCACACAGCG CCTGTAGAAG 840
AGAGCACAGC ATATGTTCCC AAGGCCTGAG TTCTGGACCT ACCCCCACGT GGTGTAAGCA 900
GAGGAGGAAT TGGTTCACTT AACTCCCAGC AAACATCCTC CTGCCACTTA GGAGGAAACA 960
CCTCCCTATG GTACCATTTA TGTTTCTCAG AACCAGCAGA ATCAGTGCCT AGCCTGTGCC 1020
CAGCAAATAG TTGGCACTCA ATAAAGATTT GCAGAATTTA ATACAGATCT TTTCAGCTGT 1080
TCTTAGGGCA TTATAAATGG AAATCATAAC GTGGTTCTAG GTTATCAAAC CATGGAGTGA 1140
TGTGGAGCTA GGATTGTGAG TGACCTGCAG GCCATTATCA GTGCCTCATC TGTGCAGAAG 1200
TCGCAGCAGA GAGGGACCAT CCAAATACCT AAGAGAAAAC AGACCTAGTC AGGATATGAA 1260
TTTGTTTCAG CTGTTCCCAA AGGCCTGGGA GCTTTTTGAA AAGAAAGAAA AAAGTGTGTT 1320
GGCTTTTTTT TTTTTTAGAA AGTTAGAATT GTTTTTACCA AGAGTCTATG TGGGGCTTGA 1380
TTCACCCTTC ATCCATTGCC TGGAACATGG ATTGGGGATT TGATAGAAAA ATAAACCCTG 1440
CTTTTGATTC AAAAAAAAAA AAAAAAWAAA AAAAACTCGA 1480

(2) INFORMATION FOR SEQ ID NO: 208:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 872 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 208:

CAGTATTTCC CTCAGTACTG TAAGCAAAAG TGGTATGTTT TTCTTTCTTT ATGTCTACTC 60

TGTCCTCTGT GGCCTTCTGG TGTACCCCTC TCTTCCTAGC CATTCAGTCT CTCTAGTCAC 120

CTCCCTAGTA GCTAGTGCTC TCTAAGTTTT TATTTAATTA GAACAACTCC ATTTCCATTT 180

CAAGGTAGGT CAATGGGGGG AAAAGCCTCA TGATTTAAAC TGAAGTTAAC AACACAGCTT 240

TTAAAATGAA AACTCATACT CCAACTTCTA AAGTATATTT GAGCTGATTT GTTTCCAAAA 300

CAAAGATATG CTGTACCTAA AACTGCTAAA ACAAAAATAT AAAGACAAGG ACTAGGTGAT 360

TAAGGGGAGA GAAAAATCAT YTCTTTTCCA GGAAACCTTT GCTAAAATAA GCAAAACTTG 420

ANTCTATGCT TCATGGAAAC TGACACAAAG AAAAGAAACT GATGGATTGC ACAGGCCTTG 480

TTATAGAAAT AGATCTATAA AAAGATCTGT CCACAGGAAA TATACACCTT CTCCTGGTTC 540

TGAACTTCAA TGGGGATTTG TCACCTAGGT CTCCATCTAT AGGAATACCT TCACATACCT 600

ATCTATTCAT GCACATATTC TGAAAACAGG TACATACAAA ATTACAACAA AGGAAAAAAA 660

TTCTATTGAA CACTTAAAAA TAGAAACAGG CCAGGCACGG TGGCTCATGC TGTAATCCCA 720

ACAATTTGGG AGGCTGAGGC TGGTGGATCA CCTGAGGTCA GGAGTGTGAG ACCAGCTTGG 780

CCAACATGGT GAAACCCCGT CACTACTAAA AATACAAAAA AAATTAGCCT GTGTGGTGGC 840

ACACTCNTAC AATCCNGGCT GACTCGGGAA AN 872

(2) INFORMATION FOR SEQ ID NO: 209:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1779 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 209:

AATTGCCAAG ACTGCACAAA ATTACAGTGC TAATGTATAT GGTTGCAGTT CACATAAAGA 60

CAAAAGCATC TGTTATGAAA TGAGTAGTAA TATTGGGTGG TTGATTTGTT CTTAGCAGAC 120

TTGGCTTCAT WTTGGTCTTG AGATAAAATG GCCAGCATAA ATGCTGTTTA TATTCACGTT 180

TTCCTAGGTG TGTGTGTGCA GGCCACAGCA GCATGCCCTT GGTGTAGTCA GTGCCGAAAS 240

GGGTCTGTTC CTTCTTGAGC CTGCCTGCAG GGATGGTCTC CTTTTAAAGC AGGTTGTGTG 300

CAGCATTCAG TACACTGAAG GTAAGCTAAA CCATCAACAT CTCTGGTGTT TTAAGATGTT 360

ATTTTATTGG AACAACTGAC AAATGAGGGA TGTTAGCTTT GTGGCAGAAT TCCCTGCATG 420

TGTGATAACT GATCTTGTTT TATTTTTTGG CATTGCAACT GTGGCATAGT TACAATTTCT 480

GTTTGKTCAT CACATTTAAA ATTGGRAGAG AACGCGCTTG AKGGATAGAG CGCCTTCAGK 540

GTACTGTTTC TTATTAACTT TACTTTTTTT AAATCAACTT GCTATAGACT TTATATACAT 600

TTTGTTAAAT ATAGTTCCTA GTGACATAGA AACGATGCGT AGTTTTCATT TACTAATTAC 660
AAATGTTGAG GCCTAATTCT GAAAGTCCTC ATATTTAAAG GCTAGACAAC GTAATGAAAT 720
TTTTAACTAT TTGTATGTCA TTTTGAAAGT GTACTGCTTT ATGGTAAAAG TGTTTTTCAT 780
TTGTTCATTG TTTTCATTAT TTGTGATCAT GTTGTCTTTC AATACAGGCA TAAACCTTCC 840
ACTCTTGAAC AAAGCAGCTG CTTTTTAAAA GCGGTAATTG CTTCTTTACC TTTTATTTCT 900
TTTGTAAATG AAGCTTTTCT TTAAGAATGT GACTTTAAAG TGTTGTCTAT TGCATAAAAC 960
AGTTGACACT CACTTATTGT AAAGTGAAGA TTGTTCTACT GCATGTGAAG TGGACCATGC 1020
AGATTTCTGT ATGTTCTCAG TATGCATCAC TAGATAATAA AGTCTTTTGT GAACAAGGCA 1080
TTTGTAGCCA TTTTTAAAAG TTTTTGTCTT CAGTGCTGGT AAGTCAGGTA AACCATAAAT 1140
AGTTAAAAGC AACCTTTTGT TTTTTTCCTG AAAGTTTTTA ATTGAAAGTA TTATTAGTTA 1200
AAGATGTAAA CCTAGCCAAA ATTACCAGTT TATTAATAAT TAGGATCCTA ATTATTTCAA 1260
AAAATCCTAC AAATATTGTC AGCTTTCAGT GTAGTGAGAT TATTCCTGTA GGTTATGGGG 1320
TATAATTCAG GATTTAACTA ATGTTTCTGC TATTTTCTCA CTTTTCCTTT TGATGGTGCG 1380
GAAAGAGAAA AAGGAAAACG GGGCACAGGC CATTCGACGC CTTCTCCAAG GGGTCTGATT 1440
TGCTGAGACA CCAGCTTCAC CTTCTTAACA AGGCACCTAA TTACAACAAG CATGCACATT 1500
TTGGTGCATT CAAGAATGGA AAATCAGAAT AGCAGCATTG ATTCTTCTGG TGCAGCTCAG 1560
TGGAAGATGA TGACAACCAG AAGACATGAG CTAAGGGTAA GGGACTGTTC TGAAGAACCT 1620
TTCCATTTAG TGATCAAGAT ATGGAAGCTG ATTTCTGAAA ATGCTCAGTG TGTACTCTAA 1680
TTATTTATGG TACCATTTGA ATTGTAACTT GCATTTTAGC AGTGCATGTT TCTAATTGAC 1740
TTACTGGGAA ACTGAATAAA ATATGCCTCT TATTATCAA 1779

(2) INFORMATION FOR SEQ ID NO: 210:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2110 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 210:

GCGGCCGCTG CAGCCCGGAG CTGAGCTAGC CGTCCGAGCC GAGCCGTCCG AGCCGGGGAA 60
GCCGGCGCGT GCTGCCGCTC GTGGCGGCCA GAGGAGAGGA GAGGCAGCAG CATGGCGAGT 120
GTCCTGTCCC GACGCCTTGG AAAGCGGTCC CTCCTGGGAG CCCGGGTGTT GGGACCCAGT 180

GCCTCGGAGG GGCCTCGGCT GCCCCACCCT CGGAGCCACT GCTAGAAGGG GCCGCTCCCC 240
AGCCTTTCAC CACCTCTGAT GACACCCCCT GCCAGGAGCA GCCCAAGGAA GTCCTTAAGG 300
CTCCCAGCAC CTCGGGCCTT CAGCAGGTGG CCTTTMAGCC TGGGCAGAAG GTTTATGTGT 360
GGTACGGGGG TCAAGAGTGC ACAGGACTGG TGGWGCAGCA CAGCTGGATG GAGGGTCAGG 420
TGACCGTCTG GCTGCTGGAG CAGAAGCTGC AGGTCTGCTG CAGGGTGGAG GAGGTGTGGC 480
TGGCAGAGCT GCAGGGCCCC TGTCCCCAGG CACCACCCCT GGAGCCCGGA GCCCAGGCCC 540
TGGCCTACAG GCCCGTCTCC AGGAACATCG ATGTCCCAAA GAGGAAGTCG GACGCATGGA 600
AATGGATGAG ATGATGGCGG CCATGGTGCT GACGTCCCTG TCCTGCAGCC CTGTTGTACA 660
GAGTCCTCCC GGGACCGAGG CCAACTTCTC TGCTTCCCGT GCGGCCTGCG ACCCATGGAA 720
GGAGAGTGGT GACATCTCGG ACAGCGGCAN CAGCACTACC AGCGGTCACT GGAGTGGGAG 780
CAGTGGTGTC TCCACCCCCT CGCCCCCCCA CCCCCAGGCC AGCCCCAAGT ATTTGGGGGA 840
TGCTTTTGGT TCTCCCCAAA CTGATCATGG CTTTGAGACC GATCCTGACC CTTTCCTGCT 900
GGACGAACCA GCTCCACGAA AAAGAAAGAA CTCTGTGAAG GTGATGTACA AGTGCCTGTG 960
GCCAAACTGT GGCAAAGTTC TGCGCTCCAT TGTGGGCATC AAACGACACG TCAAAGCCCT 1020
CCATCTGGGG GACACAGTGG ACTCTGATCA GTTCAAGCGG GAGGAGGATT TCTACTACAC 1080
AGAGGTGCAG CTGAAGGAGG AATCTGCTGC TGCTGCTGCT GCTGCTGCCG CAGACCCCCA 1140
GTCCCTGGGA CTCCCACCTC CGAGCCAGCT CCCACCCCCA GCATGACTGG CCTGCCTCTG 1200
TCTGCTCTTC CACCACCTCT GCACAAAGCC CAGTCCTCCG GCCCAGAACA TCCTGGCCCG 1260
GAGTCCTCCC TGCCCTCAGG GGCTCTCAGC AAGTCAGCTC CTGGGTCCTT CTGGCACATT 1320
CAGGCAGATC ATGCATACCA GGCTCTGCCA TCCTTCCAGA TCCCAGTCTC ACCACACATC 1380
TACACCAGTG TCAGCTGGGC TGCTGCCCCC TCCGCCGCCT GCTCTCTMTC TCCGGTCCGG 1440
AGCCGGTCGC TAAGCTTCAG CGAAGCCCCA GCAGCCAGCA CCTGCGATGA AATCTCATCT 1500
GATCGTCACT TCTCCACCCC GGGCCCAGAG TGGTGCCAGG AAAGCCCGAG GGGAGGCTAA 1560
GAAGTGCCGC AAGTGTATGG CATCGAGCAC CGGGACCAGT GGTGCACGGC CTGCCGGTGG 1620
AAGAAGGCCT GCCAGCGCTT TCTGGACTGA GCTGTGCTGC AGGTTCTACT CTGTTCCTGG 1680
CCCTGCCGGC AGCCACTGAC AAGAGGCCAG TGTGTCACCA GCCCTCAGCA GAAACCGAAA 1740
GAGAAAGAAC GGAAACACGG AGTTTGGGCT CTGTTGGCTA AGGTGTAACA CTTAAAGCAA 1800
TTTTCTCCCA TTGTGCGAAC ATTTTATTTT TTAAAAAAAA GAAACAAAAA TATTTTTCCC 1860
CCTAAAATAG GAGAGAGCCA AAACTGACCA AGGCTATTCA GCAGTGAACC AGTGACCAAA 1920
GAATTAATTA CCCTCCGTTT CCCACATCCC CACTCTCTAG GGGATTAGCT TGTGCGTGTC 1980

AAAAGAAGGA ACAGCTCGTT CTGCTTCCTG CTGAGTCGGT GAATTCTTTG CTTTCTAAAC 2040

TCTTCCAGAA AGGACTGTGA GCAAGATGAA TTTACTTTTC TTAAAAAAAA AAAAAAAAAA 2100

AAAAACTCGA 2110

(2) INFORMATION FOR SEQ ID NO: 211:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 938 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 211:

GGCACAGGAA AAAAAAGAAA AAAGAAAAAA GAAAAAAGTT TTTGTACCCA CAGATTAGCA 60

TTTTCTTGAT GTTTGAAAAA AGTTTAAGCT ATGTCCTAAT TTAAAAATGA GCACAAACTA 120

CTTAACAGAT GTCTGTTCCC TCTTCTCTTA CTTAAATTAT CTTTATTTTC ACCATCACCT 180

CCCAGTGCCG AACACCTGAN CTCTGTGTTT TGTGGTTGGA TCCTGGGTTG CCAAGTTCCT 240

ATTTGGTCAG TCCCTGGCCT GTGGGGCGGT CTCAGGAAGT GGCATGCTCT TCAMGRAGGA 300

TCGTTCATYT CCAGTATAAC CAWTTTGTTA ATAATAGTTG ATAATTCCCA GCTTTTACCA 360

GATGARTTTT GACTTATTTT TCCTCCTTTG ACCTGTTCAA AGCTAACATA TCTCGGTCAG 420

TTCGGAGAGG GTGGGGGATT TGAGAATGTG AGGAGGAGTG GGGTTAGAAT GGGTTTGCCT 480

ATCTGGGCAA GGAAAGAGTT CCTAGTCGAT TGGGCACAAT GACAAAATGA TTCCATGGAT 540

AGAATCGTCC CATGTTGCTG GAACACCTCA CGTGTTGTGA ACGCCTTAAA TTCCTGCCAT 600

CCCTTCTCTG ATTCCCCACC TCCCTGTAGT TTCCACAGGA TTTATCTCTC TGTACCCCCG 660

TCCTCCAACT CTACTCTGTC AGCCTCTCCT CCATCCCTTA CTTCCCTTCT AAATTCCAGG 720

AGATGACCTC ACTTTGCAAA GCAAATTGGA GCCACCAAAT TGTAGCTCTC CTCGGTGGAA 780

ACTGCATCTG TGCTCATCCC TGCACCTTCT TGCAGAAAGC CGCCCCCTCA GGCCAAGATG 840

AGTGCCTGGC CCCCATGGGA GACTCAGACA CTTTGACCCC TTGTGACTTC AGCATCTCCC 900

TCTTTAAAGA TTCTCTCCCA ACATTCAGTC GTGCTCGA 938

(2) INFORMATION FOR SEQ ID NO: 212:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1551 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double

(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 212:

AGGCTGGACT AAGCATAGAG AACCAGGAGA GAAAGAAAGA TTTAAGAGAC TGAGTAATAT 60
TTTTTGACAG ATCATTTAAG AAACTGAGTA ATTTTTTTTT TCTCCAAAAG GGCATGGGTT 120
TTTTTTTTGT TTTGTTTTTT CTCTATTTGG CACTTTCTAG GGATTGGTCT ATAAATTTTT 180
TGAAAGATCA TAGGATAAAT TTCTTTGTAG CAACTTCCTA TTTTAGTGTT TATGTTAGGG 240
GARCCCCARG TGTCCCTGCT GATACGCCAT TAGGGCCACT TCTCAGCCTC TGGCTACATC 300
ATAATGCTTT TTTTTCTATC TTGCCAAAGT TTCCMGAAAA TTKAKGTTTT CTAATTTTAA 360
AAAAATTGGT TGTGGAGATG GGATGGGACC TCTTTATAAG CCCTGAAAAT AAGTGATTTN 420
TTTTAAGTGC TATTCTGCTA TAAACCTGAT TCTCACTTTT TTCTGTAGAC AACAGTTTTT 480
TATAATATAT CTATTTTGTG TGGACATTAT TTCCTTTTAA CCAATACTGA AATTCCATAG 540
TGTAWACTTT CTCCACATTT TCTTTGATTA ATACTTYCTT AAAATAGACA CTTGGATTGG 600
CACCAGCTGT CACCAATAAA GCTGCCCTGA ACATTGTCAA TCAATCCTGT TAACCAATTT 660
GAGAATTTTT CTGGAATGCT TAGTTAGGGA TGAAATTGCT GGGTTATAGG TATGAGTATG 720
CTTGATATAC TTTTCTCCAG AATGTCTACA CCTGTGTGTA CACCACATCT CCAGAGATAG 780
GGGAATCTTA TGTCCCTGCT AACTGCTCTC GTTATTTAAT TTTGTGACAT TTGCCGCCGC 840
CGCCGCCCCC TGCCCCCAAC ACACACATGG TATAAAGTGG TAGTTTCTTG TTTTAAATTG 900
AACTTTTGAA TGATTTGAAT TTGGGCATTT CTTTGTATCC TGAGTTATTT TGGTTTCCCG 960
TTATGTGAAT ATCCTTTTCC TATGCTTTAA CTACTTTTCT AATTTGTCCC TTTTTTNGGT 1020
TATCAAATTC CAGGCCATTG TCTATTCCAT CGTCACTTTT GGGTATTGGA AACATCTTTC 1080
CATTCTGTAG CCTGTCTGTT GAACATAAAT CTTGATTTTT ATGTAATCAG ATTTTTGTCC 1140
TTACGGTTAT GTTCTTGGAA TTTTATTTAA GAAATCTTTT TCTATCCTGA GACCACAAAA 1200
ATGTCCCCAC CATTTTCTTC TGTTTCATAG TTTTGCCTTG TATGTTTAAT CCTTTAAGGC 1260
ATGTGTAGTT CATTTTATAT GGTGTGAAAT AGTTCTTATT CATTTATTCA ACACATATTG 1320
GTGGAGTGCC TGCTGATGGT AGTACTCTTC AGAGTACTTT GTATATATTT GTGAACACAT 1380
ATTCTTGCCC TGGAAGCTTA TGTTGTCNTT CAAGGTAGAT CCNTACTCGG TTTCCACCTG 1440
TTTTCTTCAG CCCTCAGGAT GAATTCCACA ATTTTACACA TAGCACCAGT TAAGGAATAG 1500
GCTTTATTGG AGAAAAGGAA GGCTTATTAG ACCAGCATCA GCAAAAAAAA A 1551

(2) INFORMATION FOR SEQ ID NO: 213:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 997 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 213:

```
AGAGAGTCCT CAACAGAACC TAATCATGCT GGCACCCTAA TCTCATACTT CTAGCCTCCA    60
GAACTGAGAG AACATAAACT CCAGTTGTTT AAGCTACCCA GCCTAGGGTA TTTGTTATTA   120
TAGCCCAAGC TAAGTCAGGT GGAAAGGCAG AAATATTTTG AGAAGARTCA TTTCTACAAA   180
AACAGAGTTG TTCTAAATGA AATGGCCAGA TATTTCATCT TCTTCATACT AGTATTTATG   240
AAAGTTTCAT TAAACACCAC TTGGCCAGCA CCCAGGCCTG CCACCTTCAG AACGGCAAAC   300
AAAAGCAAAT GATTTGAGGA ACAAAAGAGT GGACACAGAG CCTCTCAGAA GATGGCTCCA   360
TCTTCTGAGA TGATCTTCTG AGATCATCAA TTTTCTGCAC CTGATGTCCT ACTCCAATTG   420
TAGTAGATAA GAGCAAAGAC ACTTCCTGAT CCTGTGGAAA ATGCTGGAGC TCTGCTGATG   480
GAGAGGCTGA CACTGGGACC AACAGAAGGC CGGACATTTA TTTGTTGCAG TCCTTCTGCA   540
CCTGGGCCCT CTTCAGGCCT TGTACCTTGC ACTCCCCATG CCACTGTAGC ACCTGGTAAG   600
CTGAAGTTAG GTATTTGAAG AGATAATTTG CCCCCAACAA AGAATTACTT AAAAGAAAAA   660
GGAAACCACT AAATTCCACT TGACAAACCA GTTTGTTCAG TTTTGACTTT TGCAAATTTG   720
AAACTTTCTC TTTGGCACCA TATGATTCTG TTACATTAGG GCTCATCAAT GCTAAGATAC   780
ACAGCTAGGT CTACCAGCTG CCAGTGGTCA AGAATGAAAG AACCTCTCAG AGAGAGATCA   840
GTTTCTAATA ACCTAACAGT TTTCCTTGGS TATTACMGAA AAAAAAAAAA TTAGAATAAA   900
ATGTCAGTGC CATGCAGGCA AGTACAGATA TGGAAATGAA AGTTTTGTCT ACAACTGCAA   960
GATTTGTTTG TTAATAAAAT TGATTGGGAT CACTCGA                            997
```

(2) INFORMATION FOR SEQ ID NO: 214:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1496 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 214:

```
GAATTCGGCA CGAGTGACCA CAGATATCTT TGGCTTTCAG CCTCACCACA ATGCTGTCCA    60
CTATGTTTTT TTTAATCGAT TGACATCTCA TGAATCCACA AATTTAGCCG CTTTTCCATC   120
```

TTTTCCATCT TTGTCATAGC TTCATCACGC ACGATGGAGG TCACTTCAGC ACTATCCGGA 180

GCGGCCTCAC GGACAGATCR GTGAATTTCC TTTTCCTTTT TCTTGATGTA CCGGATTGTC 240

GACTCGTTAA CATTGAGCTC ATGGCCAACA GCACTGTAAC TCATGCCTGA TTGGAGCTTA 300

TCCAACACGC GGAMTTTCTC CGTAAGGSAM ATCAMGGTCT TCTTTCGCTT AGGAACACTG 360

GGCARARCTT AARCACTACG CTTGGGGGCC ATTTTAGAAA GCAAAACCAC CCACAAAAAG 420

CAGAAAAAAA AGTGTCAGTA AACAGACTGN NGANAGGACT CTTTGTTTAC AGCACAGGAG 480

CTGCGACTAG AAGGCGGCGC TTCTCCCCAG TTCAAACTTC AGCTGGGAAC CTTACCTCCG 540

CCAACTCCAA ATTTTCACCC TCTGCGCATG CCCGGGAAAS AAACCCCCAG AACAGTACCG 600

TGATGATTGA TTTTAGGGTT ACAAATACAT TTTAGCAAGT AAGTGAATTT GGCATTACGA 660

ATTAATGATT AATGAAGGTC ACCTGTATTT CCATAGATAT GTAATTTTAT TTAAGCAGGT 720

TTATTATATT AAGGCGGSGA GGCAGCGCCG AAGACTACAA GTTCCAGCAT GCACCGCGTC 780

CGGGCGGGTT CGGGCTCCCA GCGAGGGCTT CAGGGACGCC AGCCCGGAGG CATCGGCCGG 840

AAGTGTCGTA GGGCAACCAC GTAGTACTCT CTGCGCATGT GCAAAGCGCT GTCGGGGGCC 900

GCCCTAGCTG CCGTCGCCGC CGCCGGGGCT CTATGGTCTC TCCCTAGAGC TTTGCCGTTG 960

GAGGCGGCTG CTGCGGTCTT GTGAGTTTGA CCAGCGTCGA GCGGCAGCAA CATGGAGGAA 1020

TTCGACTCCG AAGACTTCTC TACGTCGGAG GAGGACGAGG ACTACGTGCC GTCGGGTGAG 1080

CGATTCCGCC TGAGGCGAGA AGCGAATTGC CCCGCCCCAC GCCTCACGTG AGGCGCGCTC 1140

TGCCCCCGCG GGCGTCTGCC CTGTGGCCCA GGTGGTCCAG GGGGGCTCCT GTTCTCGAGC 1200

GTCCGCTCCC TCAGGCCCCT CATCCTCGGC CGCTCCGGCC CGAGGCGTGT GCGCGTGGCG 1260

GTTCTGTGCT CCCCTCCCGT TGGGCAGCTC CGGCCGCCGC CCCCTCTTGC AGCGCGGGAA 1320

CGGCACATGG ACACGGCCCC TTGTCGCTAG GGACGCTCGT CGGTCAGCCC CGAACGACAA 1380

CGCTGCTTCA GAAGTCGGGG CGGCAGTTCG AGCCTTGGAA GTTTTTTTCA GCCCTGGCCC 1440

GAGAGAGCTG CTGGCCAACA ACCCGTCCAA GATAGAGCTG TCCGNTCTCC GNCTGG 1496

(2) INFORMATION FOR SEQ ID NO: 215:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1308 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 215:

TTGGCANCNG GGAGAGGGAA AGAGGAGGAA ATGGGGTTTG AGGACCATGG CTTACCTTTC 60

```
CTGCCTTTGA CCCATCACAC CCCATTTCCT CCTCTTTCCC TCTCCCCGCT GCCAAAAAAA    120
AAAAAAAAGG AAACGTTTAT CATGAATCAA CAGGGTTTCA GTCCTTATCA AAGAGAGATG    180
TGGAAAGAGC TAAAGAAACC ACCCTTTGTT CCCAACTCCA CTTTACCCAT ATTTTATGCA    240
ACACAAACAC TGTCCTTTTG GGTCCCTTTC TTACAGATGG ACCTCTTGAG AAGAATTATC    300
GTATTCCACG TTTTTAGCCC TCAGGTTACC AAGATAAATA TATGTATATA TAACCTTTAT    360
TATTGCTATA TCTTTGTGGA TAATACATTC AGGTGGTGCT GGGTGATTTA TTATAATCTG    420
AACCTAGGTA TATCCTTTGG TCTTCCACAG TCATGTTGAG GTGGGCTCCC TGGTATGGTA    480
AAAAGCCAGG TATAATGTAA CTTCACCCCA GCCTTTGTAC TAAGCTCTTG ATAGTGGATA    540
TACTCTTTTA AGTTTAGCCC CAATATAGGG TAATGGAAAT TTCCTGCCCT CTGGGTTCCC    600
CATTTTTACT ATTAAGAAGA CCAGTGATAA TTTAATAATG CCACCAACTC TGGCTTAGTT    660
AAGTGAGAGT GTGAACTGTG TGGCAAGAGA GCCTCACACC TCACTAGGTG CAGAGAGCCC    720
AGGCCTTATG TTAAAATCAT GCACTTGAAA AGCAAACCTT AATCTGCAAA GACAGCAGCA    780
AGCATTATAC GGTCATCTTG AATGATCCCT TTGAAATTTT TTTTTTGTTT GTTTGTTTAA    840
ATCAAGCCTG AGGCTGGTGA ACAGTAGCTA CACACCCATA TTGTGTGTTC TGTGAATGCT    900
AGCTCTCTTG AATTTGGATA TTGGTTATTT TTTATAGAGT GTAAACCAAG TTTTATATTC    960
TGCAATGCGA ACAGGTACCT ATCTGTTTCT AAATAAAACT GTTTACATTC ATTATGGGGT   1020
ATGTATGACC TTCATTTTCC AAGAAATAGA ACTCTAGCTT AGAATTATGG ATGCTCTAAA   1080
ATGTCAGAAT GGGAACTCTC CTCGAAGTTC TCCCAAACTC AGAGACAGCA CTGCCTTCTC   1140
CTAAATGATT ATTCTTTTCT CCCTGTTTTC TGGTATTTTC TAGGCATCCT TCTCACCACA   1200
GCCATAACCC TTTTTTACTT CCATTAGGCC GTATAACTGG NGGGACNGCT GGTCGGTATA   1260
TAATACTGGT WCCAACAMAG GGGTTCTGGA TGTACACMAG GTTATCTT                1308
```

(2) INFORMATION FOR SEQ ID NO: 216:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1705 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 216:

```
TGGCCATGGA AGCGCTAGAA GGTTTAGATT TTGAAACAGC AAAGAAGGAT TTCCTTGGAT     60
CTGGAGACCC CAAAGAAACA AAGATGCTAA TCACCAAACA GGCTGACTGG GCCAGAAATA    120
```

TCAAGGAGCC CAAAGCCGCC GTGGAGATGT ACATCTCAGC AGGAGAGCAC GTCAAGGCCA 180

TCGAGATCTG TGGTGACCAT GGCTGGGTTG ACATGTTGAT CGACATCGCC CGCAAACTGG 240

ACAAGGCTGA GCGCGAGCCC CTGCTGCTGT GCGCTACCTA CCTCAAGAAG CTGGACAGCC 300

CTGGCTATGC TGCTGAGACC TACCTGAAGA TGGGTGACCT CAAGTCCCTG GTGCAGCTGC 360

AGTGGAGACC CAGCGCTGGG ATGAGGCCTT TGCTTTGGGT GAGAAGCATC CTGAGTTTAA 420

GGATGACATC TACATGCCGT ATGCTCAGTG GCTAGCAGAG AACGATCGCT TTGAGGAAGC 480

CCAGAAAGCG TTCCACAAGG CTGGGCGACA GAGAGAAGCG GTCCAGGTGC TGGAGCAGCT 540

CACAAACAAT GCCGTGGCGG AGAGCAGGTT TAATGATGCT GCCTATTATT ACTGGATGCT 600

GTCCATGCAG TGCCTCGATA TAGCTCAAGA TCCTGCCCAG AAGGACACAA TGCTTGGCAA 660

GTTCTACCAC TTCCAGCGTT TGGCAGAGCT GTACCATGGT TACCATGCCA TCCATCGCCA 720

CACGGAAGAT CCGTTCAGTG TCCATCGTCC TGAAACTCTT TTCAACATCT CCAGGTTCCT 780

GCTGCACAGC CTGCCCAAGG ACACCCCCTC GGCATCTCT AAAGTGAAAA TACTCTTCAC 840

CTTGGCCAAG CAGAGCAAGG CCCTCGGTGC CTACAGGCTG GCCCGGCACG CCTATGACAA 900

GCTGCGTGGC CTGTACATCC CTGCCAGATT CCAAAAGTCC ATTGAGCTGG GTACCCTGAC 960

CATCCGCGCC AAGCCCTTCC ACGACAGTGA GGAGTTGGTG CCCTTGTGCT ACCGCTGCTC 1020

CACCAACAAC CCGCTGCTCA ACAACCTGGG CAACGTCTGC ATCAACTGCC GCCAGCCCTT 1080

CATCTTCTCC GCCTCTTCCT ACGACGTGCT ACACCTGGTT GAGTTCTACC TGGAGGAAGG 1140

GATCACTGAT GAAGAAGCCA TCTCCCTCAT CGACCTGGAG GTGCTGAGAC CCAAGCGGGA 1200

TGACAGACAG CTAGAGATTT GCAAACAACA GCTCCCAGAT TCTTGCGGCT AGTGGGAGAC 1260

CAAGGGACTC CATCGGAGAT NAGGACCCGT TCACAGCTAA GCTRAGCTTT GAGCAAGGTG 1320

GCTCARAGTT CGTGCCAGTG GTGGTGAGCC GGCTGGTGCT GCGCTCCATG AGCCGCCGGG 1380

ATGTCCTCAT CAAGCGATGG CCCCCACCCC TGAGGTGGCA ATACTTCCGC TCACTGCTGC 1440

CTGACGCCTC CATTACCATG TGCCCCTCCT GCTTCCAGAT GTTCCATTCT GAGGACTATG 1500

AGTTGCTGGT GCTTCAGCAT GGCTGCTGCC CCTACTGCCG CAGGTGCAAG GATGACCCTG 1560

GCCCATGACC AGCATCCTGG GGACGGCCTG CACCCTCTGC CCGCCTTGGG GTCTGCTGGG 1620

CTGTGAAGGA GAATAAAGAG TTAAACTGTC AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA 1680

AAAAAAAAAA AAAAAAAAAA AAANA 1705

(2) INFORMATION FOR SEQ ID NO: 217:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 999 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 217:

```
AGCAAATCAC CTTAACGATC TGGAATGAAA CTGTGACCAG TGCCGCCCTG GGTGGTTCTG     60
GAGAGACTGC CGTCTTCTTG TTTGGCCATA GGTGCTGGGG CCCCGGCTTC AGTCACTGTC    120
TCAGACAGKA GTCCCGATAA GCAGATCACC AGTCCTCCAC TGTCCTTCCT GTCGGCCTTG    180
CTGCATGAGA AGATAGCTGC TTCCTCCCTC TTTTCCTACA CTGTAAATTA TTGTTTTACA    240
ATTGAGTGYC TTAATAATAG TYTACAAATA CTATGTATTT ATGCAAAACT GTTAAAGTTC    300
TCATCTGTTA TGATTGGATA CTTGGTCTTG TCAGTAGTGG TCAGCATTGG GTTGTGAGCT    360
TGTCCTACTC CATACGTGTT TATCCTGCTA TGCATTTTAC ATTGTGTGTT CACATCTATT    420
CCAAGGAGCC TTGCTAGAAA CAACACTGGC GGTTCCTGCA GGCCAGGCAG GCATTGGCCC    480
ATGCTGTGTC CCATAGGAGC CAATGGAAAG AACGTAGCTT GGTCTGCTAG CCAGCCGTGG    540
GGTGGCGCAG GCCAGGCAGC CTCTGCACCA GAGTCCAGCA CCTGCCCATT CCCCAGTCAC    600
ACAATCATAC TCTTCTTTCA TAGAGATTTT ATTACCACCT AGACCACCCT AGTTTTCCTC    660
TCTGTTAGTG TCCTGAGCTC TTTTGCAACA AAATGTAGGT ACAGACCAAT CCCTGTCCCT    720
TCCCCAATCA GGAGCTCCAC ACCATGAGTT GTTTGGTTTT CCAGAAGCTG CCAGTGGGTT    780
CCCGTGAATT GCGTTAAGAT ATCGATGATK TTTTTTATTG TTTTTCTTCT TGTTTTTTTA    840
AATAATATAT TTAAAGGCAG TATCTTTTGT ACTGTGAATT TGCAGTAGAA GATGCAGAAT    900
GCACTTTTTT TTTACTTCTG TTGGTGTGTA TTGTATATAG TGTGTGTGCT TCTTGTGATG    960
AAAATAAACT TTTTCTTTAT AAAAAAAAAA AAAAAAAC                            999
```

(2) INFORMATION FOR SEQ ID NO: 218:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 941 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 218:

```
GGCACGAGTA GCATTTCATT TAATCTGCAG GTATATTCTC CCAACAGTTT ATTGTCATGT     60
GATGTCCTCA GCCAAGATTG TRAGGCAGAG AGGAGCTGTC CCAACCTACT ATACCACCGA    120
GGCTGGAGAG ATCATATTTT TGGTATTAAA CTGGAGTCTC TCCATCCTTC ACATTGTTGA    180
```

```
TGTCCTCTGT AGCAAACCCG AAAAGTCAGT GACAGAAGAT GCCGCTACCG GTTTGAGCCA    240
GAGAATGACA GCTCTGGTTT GGAGAAAAGG CCCGGATGGT GGCTCTAGAA ACCCCATCCT    300
TCTGCTCTTC TTTTTTCTCC CCCTTATATT GTGCTTTCAT TCATTCATTC ATTCATCAAA    360
CATTTGTTGA GCACCTATTA TGTGTCAAGC TCTGTGCTAG CCTCTGGAAA ACCTGCCCTC    420
ATGTAGCTCA CTGTGGAGTA GGAGAAACAA TGACTACACT ATGATAAGCA CGGGTTGTCA    480
GGGTCTCACA GAGCAGTGGC CCCTCATCCA GACCGATGAG GTCAAAGAAG GCATCCAGGC    540
GAGGATGGTG TCAGAGCTAA CTGAAGAATG AGAGGGAGCT GCACCASCAG GGGTTGGAAC    600
TGAAGGTGGC AGTGCCTGGA GTCTTGATTC CAGCAGAGGG AGAGCAGTCT GTGAAAAGGC    660
ACCAAGGGTG GGAGAGGGCA GAGCACATGG AGGAACTTCA GGTAGTTCTG GATGGCSCTG    720
GGGCAAAGCT AGAGAGGTAA GAAGAATCTA CAAATGTTCC TCGAGTTACA TGAACTTCCA    780
TCCCAATAAA CCCATTGGAA ACGAAAAATT TAAGTCAGAA GTGCATTTAA GGCTGGTCCG    840
AGTAGAATGA TTTTTACAAC GAATTGATCA CAACCAGTTA CAGATGTCTT TGTTCCTTCT    900
CCACTCCCAC TGCTTCACCT GACTAGCCTT TAAAAAAAAA A                        941
```

(2) INFORMATION FOR SEQ ID NO: 219:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 575 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 219:

```
TAAGTGGAAT CCCCCGGGGT TGCAGGGAAT TCGGCACGAG GCATTCTGAG AAGCTTAAGA     60
CATACTTTGA AGACAACCCT AGGGACCTCC AGCTGCTGCG GCATGACCTA CCTTTGCACC    120
CCGCAGTGGT GAAGCCCCAC CTGGGCCATG TTCCTGACTA CCTGGTTCCT CCTGCTCTCC    180
GTGGCCTGGT RCGCCCTCAC AAGAAGCGGA AGAAGCTGTC TTCCTCTTGT AGGAAGGCCA    240
AGAGAGCAAA GTCCCAGAAC CCACTGCGCA GCTTCAAGCA CAAAGGAAAG AAATTCAGAC    300
CCACAGCCAA GCCCTCCTGA GGTTGTTGGG CCTCTCTGGA GCTGAGCACA TTGTGGAGCA    360
CAGGCTTACA CCCTTCGTGG ACAGGCGAGG CTCTGGTGCT TACTGCACAG CCTGAACAGA    420
CAGTTCTGGG GCCGGCAGTG CTGGGCCCTT TAGCTCCTTG GCACTTCCAA GCTGGCATCT    480
TGCCCCTTGA CAACAGAATA AAAATTTTAG CTGCCCCAAA AAAAAAAAAA AAAAAAAAAA    540
CTCGAGGGGG GGCCCGTACC CAATTCGCCC TATAA                               575
```

(2) INFORMATION FOR SEQ ID NO: 220:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 3018 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 220:

GCCAGCCTTA CAGGTTTTAC GTGAAATGAA AGCCATTGGA ATAGAACCCT CGCTTGCAAC 60
ATATCACCAT ATTATTCGCC TGTTTGATCA ACCTGGAGAC CCTTTAAAGA GATCATCCTT 120
CATCATTTAT GATATAATGA ATGAATTAAT GGGAAAGAGA TTTTCTCCAA AGGACCCGGA 180
TGATGATAAG TTTTTTCAGT CAGCCATGAG CATATGCTCA TCTCTCAGAG ATCTAGAACT 240
TGCCTACCAA GTACATGGCC TTTTAAAAAC CGGAGACAAC TGGAAATTCA TTGGACCTGA 300
TCAACATCGT AATTTCTATT ATTCCAAGTT CTTCGATTTG ATTTGTCTAA TGGAACAAAT 360
TGATGTTACC TTGAAGTGGT ATGAGGACCT GATACCTTCA GCCTACTTTC CCCACTCCCA 420
AACAATGATA CATCTTCTCC AAGCATTGGA TGTGGCCAAT CGGCTAGAAG TGATTCCTAA 480
AATTTGGGAA AGATAGTAAA GAATATGGTC ATACTTTCCG CAGTGACCTG AGAGAAGAGA 540
TCCTGATGCT CATGGCAAGG GACAAGCACC CACCAGAGCT TCAGGTGGCA TTTGCTGACT 600
GTGCTGCTGA TATCAAATCT GCGTATGAAA GCCAACCCAT CAGACAGACT GCTCAGGATT 660
GGCCAGCCAC CTCTCTCAAC TGTATAGCTA TCCTCTTTTT AAGGGCTGGG AGAACTCAGG 720
AAGCCTGGAA AATGTTGGGG CTTTTCAGGA AGCATAATAA GATTCCTAGA AGTGAGTTGC 780
TGAATGAGCT TATGGACAGT GCAAAAGTGT CTAACAGCCC TTCCCAGGCC ATTGAAGTAG 840
TAGAGCTGGC AAGTGCCTTC AGCTTACCTA TTTGTGAGGG CCTCACCCAG AGAGTAATGA 900
GTGATTTTGC AATCAACCAG GAACAAAAGG AAGCCCTAAG TAATCTAACT GCATTGACCA 960
GTGACAGTGA TACTGACAGC AGCAGTGACA GCGACAGTGA CACCAGTGAA GGCAAATGAA 1020
AGTGGAGATT CAGGAGCAGC AATGGTCTCA CCATAGCTGC TGGAATCACA CCTGAGAACT 1080
GAGATATACC AATATTTAAC ATTGTTACAA AGAAGAAAAG ATACAGATTT GGTGAATTTG 1140
TTACTGTGAG GTACAGTCAG TACACAGCTG ACTTATGTAG ATTTAAGCTG CTAATATGCT 1200
ACTTAACCAT CTATTAATGC ACCATTAAAG GCTTAGCATT TAAGTAGCAA CATTGCGGTT 1260
TTCAGACACA TGGTGAGGTC CATGGCTCTT GTCATCAGGA TAAGCCTGCA CACCTAGAGT 1320
GTCGGTGAGC TGACCTCACG ATGCTGTCCT CGTGCGATTG CCCTCTCCTG CTGCTGGACT 1380
TCTGCCTTTG TTGGCCTGAT GTGCTGCTGT GATGCTGGTC CTTCATCTTA GGTGTTCATG 1440

CAGTTCTAAC ACAGTTGGGG TTGGGTCAAT AGTTTCCCAA TTTCAGGATA TTTCGATGTC 1500
AGAAATAACG CATCTTAGGA ATGACTAAAC AAGATAATGG CAGTTTAGGC TGCACAACTG 1560
GTAAAATGAC TGTAGATAAA TGTTGTAATT AGTGTACACG TTTGTATTTT TGTTAATATA 1620
GCCGCTGCCA TAGTTTTCTA ACTTGAACAG CCATGAATGT TTCATGTCTC CCTTTTTTTT 1680
TTGTCTATAG CTGTTACCTA TTTTAGTGGT TGAAATGAGA GCTAGTGATG ACAGAAGGAT 1740
GTGGAATGTC TTCTTGACAT CATTGTGTAT TGCTGGTAAT CAAGTTGGTA ACGACTACTT 1800
CTAGCAGCTC TTACCACTAT GACTTAAGTG GTCCTGGAAG GCAGTAAGTG GAGGTTTGCA 1860
GCATTCCTGC CTTCATGAGG GCTTCTACCA CTGACCACTT TGCACGTACC TGGCTCCCAG 1920
ATTTACTTAG GTACCCCACG AGTCGTCCAC ATAAGCAGCT TCATCTTTAC CTTGCCAGAG 1980
TTGACAATTA TGGGATACTC TAGTCTACTT ATACTTGTGT TCCCATCTGT CTGCCATCCT 2040
CTGAAGGCCA GGACCCAGTC ATACATCCTT AGAAACCAAA GTATGGTTTT TGTTTTCTCT 2100
TGGAATGTCA GGTCTTAAGG CATTTAATTG AGGGACAAAA AAAAAAAAAA GCCGATATAG 2160
TAGCTAGCTA CTTAAGCATC CATGGGTATT GCTCCATATC AAAGCAGATT TGCAGGACAG 2220
AAAGAGTAAA TTAGCCTTCA GTCTTGGTTT ACAGCTTCCA AGGAGAGCCT TGGSCACCTG 2280
AAATGTTAAC TCGGTCCCTT CCTGTCTCTA GTTCATCAGC ACCTGCAGAT GCCTGACTCT 2340
TGTTAGCCTT ACTATTCAAT ACAGTCCTTA GATTCACGGT ATGCCTCTTC CTATCCAGGC 2400
ACCTATTCTG AATCACCATG TTGCTCTGCA GCTAGAGTTG ATAGGAGAAA ATCCATTTGG 2460
GTAGATGGCC TATGAATTTG TAGTAGACTT TCAAAATGAG TGATTTGTTA GCTTGGTACT 2520
TTTAAGTTTG TGGTACAGAT CCTCCAAACC CATACTCTGA GCAATTAACT GCCTTGAACA 2580
TAGAGAAAAA TTAAGGCCTC ACAGGATGAG TCTCCATTCT CTGTAAATGC TTATTTTATC 2640
ATAGTCTTTA GCCTCTAACT ATGAGTAAAA TGTTCTCTTC GGCCGGGTGT GGTGACTCAC 2700
ACCTGTAACC TCAGCACTTT GGGAGGCAGA GGTGGCAGGA TCACTTAGGT CCAGGAGTTC 2760
GAGACTAGCC TGGGCAACAT AGTGAGACAC CGGATCTACA AAAAAATAAA AAGCCAGACT 2820
GGTGGTATGT ATCTGTGTCC CAGCTAATTG GGAGGGTGAG ATGGGAGGAT TGTTTGAGCC 2880
TAGGAGAGGG AGGTTGCAGT GAGCCGTGAT CGCACCACTG CACTCCAGCC TGGGCAACAG 2940
AGCAAGACCC TGTCTTGGAG AAACCAGAAT TTTGGAAGAG CAAATGGGGC TGAGTGCAGT 3000
GGCTCATGCC TGTAATCC 3018

(2) INFORMATION FOR SEQ ID NO: 221:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 968 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 221:

```
GGCACGAGGG CCGCGGGACA TCCACGGGGC GCGAGTGACA CGCGGGAGGG AGAGCAGTGT     60
TCTGCTGGAG CCGATGCCAA AAACCATGCA TTTCTTATTC AGATTCATTG TTTTCTTTTA    120
TCTGTGGGGC CTTTTTACTG CTCAGAGACA AAAGAAAGAG GAGAGCACCG AAGAAGTGAA    180
AATAGAAGTT TTGCATCGTC CAGAAAACTG CTCTAAGACA AGCAAGAAGG GAGACCTACT    240
NAAATGCCCA TTATGACGGC TACCTGGCTA AAGACGGCTC GAAATTCTAC TGCAGCCGGA    300
CACAAAATGA AGGCCACCCC AAATGGTTTG TTCTTGGTGT TGGGCAAGTC ATAAAAGGCC    360
TAGACATTGC TATGACAGAT ATGTGCCCTG GAGAAAAGCG AAAAGTAGTT ATACCCCCTT    420
CATTTGCATA CGGAAAGGAA GGCTATGCAG AAGGCAAGAT TCCACCGGAT GCTACATTGA    480
TTTTTGAGAT TGAACTTTAT GCTGTGACCA AAGGACCACG GAGCATTGAG ACATTTAAAC    540
AAATAGACAT GGACAATGAC AGGCAGCTCT CTAAAGCCGA GATAAACCTC TACTTGCAAA    600
GGGAATTTGA AAAAGATGAG AAGCCACGTG ACAAGTCATA TCAGGATGCA GTTTTAGAAG    660
ATATTTTTAA GAAGAATGAC CATGATGGTG ATGGCTTCAT TTCTCCCAAG GAATACAATG    720
TATACCAACA CGATGAACTA TAGCATATTT GTATTTCTAC TTTTTTTTTT TAGCTATTTA    780
CTGTACTTTA TGTATWAAAC AAAGTCMCTT TTCTCCMAGT TGKATTTGCT ATTTTTCCCC    840
TATGAGAAGA TATTTTGATC TCCCCAATAC ATTGATTTTG GTATAATAAA TGTGAGGCTG    900
TTTTGCAAAC TTAAAAAAAA ATTTAAAAAA ACTGGAGGGG GGCCCGTACC CAANTCGCCG    960
NATATGAT                                                             968
```

(2) INFORMATION FOR SEQ ID NO: 222:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1404 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 222:

```
CGTTTTCCGG CCGTGCGTTT GTGGCCGTCC GGCCTCCCTG ACATGCAGCC CTCTGGACCC     60
CGAGGTTGGA CCCTACTGTG ACACACCTAC CATGCGGACA CTCTTCAACC TCCTCTGGCT    120
TGCCCTGGCC TGCAGCCCTG TTCACACTAC CCTGTCAAAG TCAGATGCCA AAAAAGCCGC    180
```

CTCAAAGACG CTGCTGGAGA AGAGTCAGTT TTCAGATAAG CCGGTGCAAG ACCGGGGTTT 240

GGTGGTGACG GACCTCAAAG CTGAGAGTGT GGTTCTTGAG CATCGCAGCT ACTGCTCGGC 300

AAAGGCCCGG GACAGACACT TTGCTGGGGA TGTACTGGGC TATGTCACTC CATGGAACAG 360

CCATGGCTAC GATGTCACCA AGGTCTTTGG GAGCAAGTTC ACACAGATCT CACCCGTCTG 420

GCTGCAGCTG AAGAGACGTG GCCGTGAGAT GTTTGAGGTC ACGGGCCTCC ACGACGTGGA 480

CCAAGGGTGG ATGCGAGGTG TCAGGAAGCA TGCCAAGGGC CTGCACATAG TGCCTCGGCT 540

CCTGTTTGAG GACTGGACTT ACGATGATTT CCGGAACGTC TTAGACAGTG AGGATGAGAT 600

AGAGGAGCTG AGCAAGACCG TGGTCCAGGT GGCAAAGAAC CAGCATTTCG ATGGCTTCGT 660

GGTGGAGGTC TGGAACCAGC TGCTAAGCCA GAAGCGCGTG GGCCTCATCC ACATGCTCAC 720

CCACTTGGCC GAGGCTCTGC ACCAGGCCCG GCTGCTGGCC CTCCTGGTCA TCCCGCCTGC 780

CATCACCCCC GGGACCGACC AGCTGGGCAT GTTCACGCAC AAGGAGTTTG AGCAGCTGGC 840

CCCCGTGCTG GATGGTTTCA GCCTCATGAC CTACGACTAC TCTACAGCGC ATCAGCCTGG 900

CCCTAATGCA CCCCTGTCCT GGGTTCGAGC CTGCGTCCAG GTCCTGGACC CGAAGTCCAA 960

GTGGCGAAGC AAAATCCTCC TGGGGCTCAA CTTCTATGGT ATGGACTACG CGACCTCCAA 1020

GGATGCCCGT GAGCCTGTTG TCGGGGCCAG GTACATCCAG ACACTGAAGG ACCACAGGCC 1080

CCGGATGGTG TGGGACAGCC AGGYCTCAGA GCACTTCTTC GAGTACAAGA AGAGCCGCAG 1140

TGGGAGGCAC GTCGTCTTCT ACCCAACCCT GAAGTCCCTG CAGGTGCGGC TGGAGCTGGC 1200

CCGGGAGCTG GGCGTTGGGG TCTCTATCTG GGAGCTGGCC AGGGCCTGGA CTACTTCTAC 1260

GACCTGCTCT AGGTGGGCAT TGCGGCCTCC GCGGTGGACG TGTTCTTTTC TAAGCCATGG 1320

AGTGAGTGAG CAGGTGTGAA ATACAGGCCT NCACTCCGTT TGCTGTGAAA AAAAAAAAAA 1380

AAAAAAAAAA AAAAAAAAAA AAAA 1404

(2) INFORMATION FOR SEQ ID NO: 223:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 707 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 223:

NGCGCGCCTG CAGTCGACAC TAGTGGATCC AAAGAATTCG GCACGAGGGC AGGTCCAGGG 60

CTCAGAAATC AGCTCTATTG ACGAATTCTG CCGCAAGTTC CGCCTGGACT GCCCGCTGGC 120

CATGGACCGG ATCAAGGAGG ACCGGCCCAT CACCATCAAG GACGACAAGG GCAACCTCAA 180

```
CCGCTGCATC GCAGACGTGG TCTCGCTCTT CATCACGGTC ATGGACAAGC TGCGGCTGGA     240
GATCCGCGCC ATGGATGAGA TCCAGCCCGA CCTGCGAGAG CTGACGGAGA CCATGCACCG     300
CATGAGCCAC CTCCCACCCG ACTTTGAGGG CCGCCAGACG GTCAGCCAGT GGCTGCAGAC     360
CCTGAGCGGC ATGTCGGCGT CAGATGAGCT GGACGACTCA CAGGTGCGTC AGATGCTGTT     420
CGACCTGGAG TCAGCCTACA ACGCCTTCAA CCGCTTCCTG CATGCCTGAG CCCGGGGCAC     480
TAGCCCTTGC ACAGAAGGGC AGAGTCTGAG GCGATGGCTC CTGGTCCCCT GTCCGCCACA     540
CAGGCCGTGG TCATCCACAC AACTCACTGT CTGCAGCTGC CTGTCTGGTG TCTGTCTTTG     600
GTGTCAGAAC TTTTGGCCCG GGCCCCTCCC CACAATAAAG ATGCTCTCCG ACTTTCAAAA     660
AAAAAAAAAA AAAAACTCRG GGGGGGCCCG GTCCCAATCC CCC[illegible]           707
```

(2) INFORMATION FOR SEQ ID NO: 224:

(i) SEQUENCE CHARACTERISTICS:
- (A) LENGTH: 1364 base pairs
- (B) TYPE: nucleic acid
- (C) STRANDEDNESS: double
- (D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 224:

```
GGGGAACTGC AGTGACAGCA GGAGTAAGAG TGGGAGGCAG GACAGAGTTG GGACACAGGT      60
ATGGAGAGGG GGTTCAGCGA GCCTAGAGAG GGCAGACTAT CAGGGTGTCG GCGGTGAGAA     120
TCCAGGGAGA GGAGCGGAAA CAGAAGAGGG GCAGAAGACC GGGGCACTTG TGGGTTGCAG     180
AGCCCCTCAG CCATGTTGGG AGCCAAGCCA CACTGGCTAC CAGGTCCCCT ACACAGTCCC     240
GGGCTGCCCT TGGTTCTGGT GCTTCTGGCC CTGGGGGCCG GGTGGGCCCA GGAGGGGTCA     300
GAGCCCGTCC TGCTGGAGGG GGAGTGCCTG GTGGTCTGTG AGCCTGGCCG AGTTGCTGCA     360
GGGGGGCCCG GGGGAGCAGC CCTGGGAGAG GCACCCCCTG GGCGAGTGGC ACTTGCTGCG     420
GTCCGAAGCC AMCACCATGA GCCAGCAGGG GAAACCGGCA ATGGCACCAK TGGGGCCATC     480
TACTTCGACC AGGTCCTGGT GAACGAGGGC GGTGGCTTTG ACCGGGCCTC TGGCTCCTTC     540
GTAGCCCCTG TCCGGGGTGT CTACAGCTTC CGGTTCCATG TGGTGAAGGT GTACAACCGC     600
CAAACTGTCC AGGTGAGCCT GATGCTGAAC ACGTGGCCTG TCATCTCAGC CTTTGCCAAT     660
GATCCTGACG TGACCCGGGA GGCAGCCACC AGCTCTGTGC TACTGCCCTT GGACCCTGGG     720
GACCGAGTGT CTCTGCGCCT GCGTCGGGGG AATCTACTGG GTGGTTGGAA ATACTCAAGT     780
TTCTCTGGCT TCCTCATCTT CCCTCTCTGA GGACCCAAGT YTTTCAAGCA CAAGAATCCA     840
```

GCCCCTGACA ACTTTCTTCT GCCCTCTCTT GCCCCAGAAA CAGCAGAGGC AGGAGAGAGA 900

CTCCCTCTGG YTCCTATCCC ACYTCTTTGC ATGGGAMCCT GTGCCAAACA CCCAAGTTTA 960

AGARAARARY ARARCTGWGG CAGGTATACA GAGCTGGAAG TGGACCATGG AAAACATSGA 1020

TAACCATGCA TCYTCTTGCT TGGCCACCTC CTGAAACTGT CCACCTTTGA AGTTTGAACT 1080

TTAGTCCCTC CAMACTCTGA CTGCTGCCTC CTTCCTCCCA GCTCTCTCAC TGAGTTATYT 1140

TCACTGTACC TGTTCCAGCA TATCCCCACT ATCTCTCTTT CTCCTGATCT GTGCTGTCTT 1200

ATTCTCCTCC TTAGGCTTCC TATTACCTGG GATTCCATGA TTCATTCCTT CAGACCCTCT 1260

CCTGCCAGTA TGCTAAACCC TCCCTCTCTC TTTCTTATCC CGCTGTCCCA TTGGCCCAGC 1320

CTGGATGAAT CTATCAATAA AACAACTAGA GAATGGTGGT CAAAAAAAAA AAAAAAAAAC 1380

TCGA 1384

(2) INFORMATION FOR SEQ ID NO: 225:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 760 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 225:

GGGTCGACCC ACGCGTCCGC TGACCAGTCC GTTATAGATA CTTCTTCCTA TACCAAAACT 60

GTTTAAACAG GTGCCACCAC AAGGGATGTC GTCCTTACTC TCTGCGGGTC TTCAAGCATC 120

CCTTTGTGGG AAARGTCTCT GGGCAAGCAC GTGGTATTTG GTCTGCTGCT TGCTTCCCTT 180

TTTCCACCAG GGATGTTGTG ATCATAAGTC AAAACAACAG TATATTCCAA ATCTCAAAAG 240

CTATTGTGGC CTGAGCACAA TTGAAATCTA GCAGAGTTTT TCCTATGTAG CTTTAGAGTA 300

ACTCTTCTGC TTCTCTGTCA CTTACAATTC AGGTTCTGCC TTTGCCTAAG AGCATGAGCA 360

GAAGAGTCCT CATGTGACGC TTAGTTCTAT TGCAGTCCTG GGTGAAACTA TTTAAGCWAT 420

GGGGCTGCTK CTCCCCANWT CCTCCCTAAC AATTCGTTGT GTGGACTTCT CATCTAAAAG 480

GTTAGTGGCT TTTGCTTGGG ATCAGTGCTC TCTATTGATG TTCTTGCTGG TCTCCAGACA 540

CATTCCTGTT GCATTAAGAC TTGAAAGACT TGTAGATGTG TGATGTTCAG GCACAGGATC 600

CTGAAAGCTA TGTTACTATT CTTAGTTTGT AAATTGTCCT TTTGATACCA TCATCTTGTT 660

TTCTTTTTGT AGGTATAAAT AAAAACACTG TTGACAATAA AAAAAAAAAA AAAAAAAAAA 720

AAAAAAAAAA AAAAAAAAAA NAAAAAAAAA AAAAAAAAAA 760

(2) INFORMATION FOR SEQ ID NO: 226:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2057 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 226:

```
CCGAGCCGGC TGCGCCGGGG GAATCCGTGC GGGCGCCTTC CGTCCCRGTC CCATCCTCGC     60
CGCGCTCCAG CACCTCTGAA GTTTTGCAGC GCCCAGAAAG GAGGCGAGGA AGGAGGGAGT    120
GTGTGAGAGG AGGGAGCAAA AAGCTCACCC TAAAACATTT ATTTCAAGGA GAAAAGAAAA    180
AGGGGGGGCG CAAAAATGGC TGGGGCAATT ATAGAAAACA TGAGCACCAA GAAGCTGTGC    240
ATTGTTGGTG GGATTCTGCT CGTGTTCCAA ATCATCGCCT TTCTGGTGGG AGGCTTGATT    300
GCTCCAGGGC CCACAACGGC AGTGTCCTAC ATGTCGGTGA AATGTGTGGA TGCCCGTAAG    360
AACCATCACA AGACAAAATG GTTCGTGCCT TGGGGACCCA ATCATTGTGA CAAGATCCGA    420
GACATTGAAG AGGCAATTCC AAGGGAAATT GAAGCCAATG ACATCGTGTT TTCTGTTCAC    480
ATTCCCCTCC CCCACATGGA GATGAGTCCT TGGTTCCAAT TCATGMTGTT TATCCTGCAG    540
CTGGACATTG CCTTCAAGCT AAACAACCAA ATCAGRGAAA ATGCAGAAGT CTCCATGGAC    600
GTTTCCCTGG CTTACCGTGA TGACGCGTTT GCTGAGTGGA CTGAAATGGC CCATGAAAGA    660
GTACCACGGA AACTCAAATG CACCTTCACA TCTCCCAAGA CTCCAGAGCA TGGAGGGCCG    720
GTTACTATGA ATGTGATGTC CTTCCTTTCA TGGAAATTGG GTCTGTGGCC CATGAAGTTT    780
TACCTTTTAA ACATCCGGCT GCCTGTGAAT GAGAAGAAGA AAATCAATGT GGGAATTGGG    840
GAGATAAAGG ATATCCGGTT GGTGGGGATC CACCAAAATG GAGGCTTCAC CAAGGTGTGG    900
TTTGCCATGA AGACCTTCCT TACGCCCAGC ATCTTCATCA TTATGGTGTG GTATTGGAGG    960
AGGATCACCA TGATGTCCCG ACCCCCAGTG CTTCTGGAAA AAGTCATCTT TGCCCTTGGG   1020
ATTTCCATGA CCTTTATCAA TATCCCAGTG GAATGGTTTT CCATCGGGTT TGACTGGACC   1080
TGGATGCTGC TGTTTGGTGA CATCCGACAG GCATCTTCTA TGCRATGCTT CTKTCCTTCT   1140
GGATCATCTT CTGTGGCGAG CACATGATGG ATCAGCACGA GCGGAACCAC ATCGCAGGGT   1200
ATTGGAAGCA AGTCGGACCC ATTGCCGTTG GTCCTTCTGC CTCTTCATAT TTGACATGTG   1260
TGAGAGAGGG GTACAACTCA CGAATCCCTT CTACAGTATC TGGACTACAG ACATTGGGAA   1320
CAGAGCTGGC CATGGCTTTC ATCATCGTGG CTGGAATCTG CCTCTGCCTC TAACTTCCTG   1380
TTTCTATGCT TCATGGTATT TCAGGTGTTT CGGAACATCA GTGGGAAGCA GTCCAGCCTG   1440
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CCAGCTATGA GTAAAGTCCG GTGGTTACAC TATGAGGGGC TAATTTTTAG GTTCAAGTTC 1500

CTCATGGTTA TCACCTTGGC TTGCGCTGCC ATGACTGTCA TCTTCTTCAT CGTTAGTCAG 1560

GTAACGGAAG GCTATTGGGA AATGGGGCGG CGTCACAGTC TCAAGTGAAC AGTGCCTTTT 1620

TCACAGGCAT CTATGGGATG TGGAATCTGT ATGTCTTTGC TCTGATGTTC TTGTATGCAC 1680

CATCCCATAA AAACTATGGA GAAGACCAGT TCAATGGAAT GCAACTCCCA TGTAAATCGA 1740

GGGAAGATTG TGTTTTGTTT GTTTCGGAAC TTTATCAAGA ACTGTTCAGC GCTTCGAAAT 1800

ATTCCTTCAT CAATGACAAC GTAGCTTCTG GTATTTGAGT CAACAAGGCA ACACATGTTT 1860

ATCAGCTTTG CATTTGCAGT TTTCACAGTC ACATTGATTG TACTTGTATA CGCACACAAA 1920

TACACTCATT TAGCCTTTAT TTCAAAATGT TAAATATAAG GAAAAAAGCG TCAACAATAA 1980

ATATTCTTTG AGTATTGTGT TACTTCTCTT AAAAAAAAAA AAAAAAACTC GTGCCGAATT 2040

CGGCACGAGC GGTACGA 2057

(2) INFORMATION FOR SEQ ID NO: 227:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2084 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 227:

GGCAGAGGGT CATTTCCTGC AAAGAGCCAA ACCCCGATTC CTCTGTGCCC CTCCTCTCCC 60

ACCAAGTGCT TTATAAAAAT AGTTCTTGTT ACCGGAAATA ACTGTTCATT TTTCACTCCT 120

CCCTCCTAGG TCACACTTTT CAGAAAAAGA ATCTGCATCC TGGAAACCAG AAGAAAAATA 180

TGAGACTGGG AATCATCGTG TGATGTGTGT SCTGCCTTTG GCTGAGTGTG TGGAGTCCTG 240

CTCAGGTGTT AGGTACAGTG TGTTTGATCG TGGTGGCTTG AGGGGAACCG CTTGTTCAGA 300

GCTGTGACTG CGGCTGCAGT GCAGAGAAGC TGCCCTTGGC TGCTCGTAGC GCCGGGCCTT 360

CTCTCCTCGT CATCATCCAG AGCAGCCAGT GTCCGGGAGG CAGAAGGTAC CGGGGCAGCT 420

ACTGGAGGAC TGTGCGGGGC TGCCTGGGGT GCCCCCTCCG CCGTGGGGCC CTGTTGCTGC 480

TGTCCATCTA TTTCTACTAC TCCCTCCCAA ATGCGGTCGG CCCGCCCTTC ACTTGGATGC 540

TTGCCCTCCT GGGCCTTCTC GCAGGCACTG AACATCCTCC TGGGCCTCAA GGGCCTGGCC 600

CCAGCTGAGA TCTCTGCAGT GTGTGAAAAA GGGAATTTCA ACGTGGCCCA TGGGCTGGCA 660

TGGTCATATT ACATCGGATA TTTGCGGTTG ATCCTGCCAG AGCTCCAGGC CCGGATTCGA 720

ACTTACAATT AGGATTACAA CAACCTGCTA CGGGGTGCAG TGAGCCAGCG GTGTNATATT 780

CTCCTCCCAT TGGACTGTGG GGTGCCTGAT AACCTGAGTA TGGCTGACCC CAACATTCGC 840
TTCCTGGATA AACTGCCCCA GCAGACCGGT GACCGTGCTG GCATCAAGGA TCGGGTTTAC 900
AGCAACAGCA TCTATGAGCT TCTGGAGAAC GGGCAGCGGG CGGGCACCTG TGTCCTGGAG 960
TACGCCACCC CCTTGCAGAC TTTGTTTGCC ATGTCACAAT ACAGTCAAGC TGGCTTTAGC 1020
GGGGAGGATA GGCTTGAGCA GGCCAAACTC TTCTGCCGGA CACTTGAGGA CATCCTGGCA 1080
GATGCCCCTG AGTCTCAGAA CAACTGCCGC CTCATTGCCT ACCAGGAACC TGCAGATGAC 1140
AGCAGCTTCT CGCTGTCCCA GGAGGTTCTC CGGCACCTGC GGCAGGAGGA AAAGGAAGAG 1200
GTTACTGTGG GCAGCTTGAA GACCTCAGCG GTGCCCAGTA CCTCCACGAT GTCCCAAGAG 1260
CCTGAGCTCC TCATCAGTGG AATGGAAAAG CCCCTCCCTC TCCGCACGGA TTTCTCTTGA 1320
GACCCAGGGT CACCAGGCCA GAGCCTCCAG TGGTCTCCAA GCCTCTGGAC TGGGGGCTCT 1380
CTTCAGTGGC TGAATGTCCA GCAGAGCTAT TTCCTTCCAC AGGGGGCCTT GCAGGGAAGG 1440
GTCCAGGACT TGACATCTTA AGATGCGTCT TGTCCCCTTG GGCCAGTCAT TTCCCCTCTC 1500
TGAGCCTCGG TGTCTTCAAC CTGTGAAATG GGATCATAAT CACTGCCTTA CCTCCCTCAC 1560
GGTTGTTGTG AGGACTGAGT GTGTGGAAGT TTTTCATAAA CTTTGGATGC TAGTGTACTT 1620
AGGGGGTGTG CCAGGTGTCT TTCATGGGGC CTTCCAGACC CACTCCCCAC CCTTCTCCCC 1680
TTCCTTTGCC CGGGGACGCC GAACTCTCTC AATGGTATCA ACAGGCTCCT TCGCCCTCTG 1740
GCTCCTGGTC ATGTTCCATT ATTGGGGAGC CCCAGCAGAA GAATGGAGAG GAGGAGGAGG 1800
CTGAGTTTGG GGTATTGAAT CCCCCGGCTC CCACCCTGCA GCATCAAGGT TGCTATGGAC 1860
TCTCCTGCCG GGCAACTCTT GCGTAATCAT GACTATCTCT AGGATTCTGG CACCACTTCC 1920
TTCCCTGGCC CCTTAAGCCT AGCTGTGTAT CGGCACCCCC ACCCCACTAG AGTACTCCCT 1980
CTCACTTGCG GTTTCCTTAT ACTCCACCCC TTTCTCAACG GTCCTTTTTT AAAGCACATC 2040
TCAGATTAAA AAAAAAAAAA AAAAAAAAAA AGGGGGGGCN GCNT 2084

(2) INFORMATION FOR SEQ ID NO: 228:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2143 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 228:

TCGACCCACG CGTCCGGTTG AATTCCTTGA CCTGCAAACA CATATTTATT AGCCTGACTC 60

AAACAATGAA GCTATTAAAA CTTCGGAGGA ACATTGTAAA ACTCTCTTTG TATCGGCATT 120

TCACCAACAC GCTTATTTTG GCAGTGGCAG CATCCATTGT GTTTATCATC TGGACAACCA 180

TGAAGTTCAG AATAGTGACA TGTCAGTCGG ACTGGCGGGA GCTGTGGGTA GACGATGCCA 240

TCTGGCGCTT GCTGTTCTCC ATGATCCTCT TTGTCATCAT GGTTCTCTGG CGACCATCTG 300

CAAACAACCA GAGGTTTGCC TTTTCACCAT TGTCTGAGGA AGAGGAGGAG GATGAACAAA 360

AGGAGCCTAT GCTGAAAGAA AGCTTTGAAG GAATGAAAAT GAGAAGTACC AAACAAGAAC 420

CCAATGGAAA TAGTAAAGTT AACAAAGCAC AGGAAGATGA TTTGAAGTGG GTAGAAGAGA 480

ATGTTCCTTC TTCTGTGACA GATGTAGCAC TTCCAGCCCT TCTGGATTCA GATGAGGAAC 540

GAATGATCAC ACACTTTGAA AGGTCCAAAA TGGAGTAAGG AATGGAAGGA TTTGCAGTTA 600

AAGATGGCTA CCATCAGGGA AGAGATCAGC ATCTGTGTCA GTCTTCTGTA CGGCTCCATG 660

GGATTAAAGG AAGCAATGAC ATCCTGATCT GTTCCTTGAT CTTTGGGCAT TGGAGTTGGC 720

GAGAGGTGTC AGAACAAAGA GAACATCTTA CTGAAAACAA GTTCATAAGA TGAGAAAAAT 780

CTACGAGCTT CTTATTTACA ACACTGCTGC CCCCTTTCCT CCCAGACTCT GACATGGATG 840

TTCATGCAAC TTAAGTGTGT TGTTCCTGAA CTTTCTGTAA TGTTTCATTT TTTAAATCTG 900

ACAAACTAAA AAGTTTAACG TCTTCTAAAA GATTGTCATC AACACCATAA TATGTAATCT 960

CCAGGAGCAA CTGCCTGTAA TTTTTATTTA TTTAGGGAGT TACATAGGTG ATGGGGGAAA 1020

TTGTTAACTA CCTTTCATTT TCCTGGGAAG TCAAGGTTAC ATCTTGCAGA GGTTGTTTTG 1080

AGAAAAAAGG GCCCTTCTGA GTTAAGGAGC CATAGTTCTA TCAATGATCA AAAGAAAAAA 1140

AAAAAAAAGA GAAACTGTTA CAGTATGATT CAGATCATTT AAAAAAGCAA AATCAAGTGC 1200

AATTTTGTTT ACAAATGGTG TATATTAAAG ATTTTTCTAT TTCAGATGTA CTTTAAAGAG 1260

AAATATTAGC TTAACTCTTT TGACATCTGC TATTGTGACA CATCCCATTG CTGGCAATGT 1320

GGTGCACACT CCGAAACTTT TAACTACTGT TTTGTAAGCC TCCAAGGGTG GCATTGCAGG 1380

GTCCTTAGGC AATGTTTTGT TTGGCTTTAT GCAGAGAGGT GCTCCAAGTG CTGTGATTGA 1440

GCACCGTGCT AGAGGAACTG TAATGCTTCA GAAGTTGTAG CTTATACAAA GGAAACAGGT 1500

CCTGCTGGCT TAATTTAAAC AGTTATTGCA TGAAGTAGCG TGGAGGCCCT GGACTGCTGC 1560

TCGTTCTTTA GGATGGACTG TTCTGGTATC TGGTATTGGT TTAGAGACTG TTAATAAGGG 1620

ACATCACAAG GTGATGGGAT TCATTTGAAG CACTCTATTT CTGTTTTAAT GGTTTTATCC 1680

AATTTTGCCT TCCCAAGATT TTTGTTCTAC ATAAAAAGTT CATGCCACTT TTTAATATAA 1740

AAAAATTTAA CAAAATTAAT GTATTTTTCT CATTTTTTTC AAACTTTTTC TAAAGACTCT 1800

TTCTGTCAAA CTCATGAAAA ATTTCTTTCT ATGGCTTTTA TTCTAGATTG TCTTATTTTC 1860

TGTTAAAACC AATGACCACA TGACCACAAT CTTCACTAAC TCATACTGCA GTGAAAGTGT 1920

TAACCCTTAG GTAGTTTCTC TACAACTCTT TGCTATGGTG ATTTTTAAAA AAGTTTCCTA 1980

GGGAAGTATC TCTGAGGGAA CAGGCAATCT GAAGGAACTG ACTATATTCT CCATGGCTAA 2040

GTCCATTAGG CCAAAAGNCT GGGTGGGTAT TGGTTGTCAN GCTGTCTATT GGCATATTAA 2100

AAACGTAGGC CGGANGGAAT AATTAGGTTG TNATGCCGGC GGG 2143

(2) INFORMATION FOR SEQ ID NO: 229:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1025 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 229:

CCTGGCCCAC ATTGCTTCAT TGGCCTGGCC ATGCGCCTGT ACTATGGCAG CCGCTAGTCC 60

CTGACAACTT CCACCCTGAT TCCGGACCCT GTAGATTGGG CGCCACCACC AGATCCCCCT 120

CCCAGGCCTT CCTCCCTCTC CCATCAGCAG CCCTGTAACA AGTGCCTTGT GAGAAAAGCT 180

GGAGAAGTGA GGGCAGCCAG GTTATTCTCT GGAGGTTGGT GGATGAAGGG GTACCCTAGG 240

AGATGTGAAG TGTGGGTTTG GTTAAGGAAA TGCTTACCAT CCCCCACCCC CAACCAAGTT 300

CTTCCAGACT AAAGAATTAA GGTAACATCA ATACCTAGGC CTGAGAAATA ACCCCATCCT 360

TGTTGGGCAG CTCCCTGCTT TGTCCTGCAT GAACAGAGTT GATGAAAGTG GGGTGTGGGC 420

AACAAGTGGC TTTCCTTGCC TACTTTAGTC ACCCAGCAGA GCCACTGGAG CTGGCTAGTC 480

CAGCCCAGCC ATGGTGCATG ACTCTTCCAT AAGGGATCCT CACCCTTCCA CTTTCATGCA 540

AGAAGGCCCA GTTGCCACAG ATTATACAAC CATTACCCAA ACCACTCTGA CAGTCTCCTC 600

CAGTTCCAGC AATGCCTAGA GACATGCTCC CTGCCCTCTC CACAGTGCTG CTCCCCACAC 660

CTAGCCTTTG TTCTGGAAAC CCCAGAGAGG GCTGGGCTTG ACTCATCTCA GGGAATGTAG 720

CCCCTGGGCC CTGGCTTAAG CCGACACTCC TGACCTCTCT GTTCACCCTG AGGGCTGTCT 780

TGAAGCCCGC TACCCACTCT GAGGCTCCTA GGAGGTACCA TGCTTCCCAC TCTGGGGCCT 840

GCCCCTGCCT AGCAGTCTCC CAGCTCCCAA CAGCCTGGGG AAGCTCTGCA CAGAGTGACC 900

TGAGACCAGG TACAGGAAAC CTGTAGCTCA ATCAGTGTCT CTTTAACTGC ATAAGCAATA 960

AGATCTTAAT AAAGTCTTCT AGGCTGTAGG GTGGTTCCTA CAACCACAGC CAAAAAAAAA 1020

AAAAA 1025

(2) INFORMATION FOR SEQ ID NO: 230:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1250 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 230:

```
GCCCACGCGT CCGCCCACGC GTCCGGCGGT GCGGAGTATG GGGCGCTGAT GGCCATGGAG      60
GGCTACTGGC GCTTCCTGGC GCYGCTGGGG TCGGCACTGC TCGTCGGCTT CCTGTCGGTG     120
ATSTTCGCCC TCGTCTGGGT CCTCCACTAC CGAGAGGGGC TTGGCTGGGA TGGGAGCGCA     180
CTAGAGTTTA ACTGGCACCC AGTGCTSATG GTCACCGGCT TCGTCTTCAT CCAGGGCATC     240
GCATCATCGT CTACAGACTG CCGTGGACCT GGAAATGCAG CAAGCTCCTG ATGAAATCCA     300
TCCATGCAGG GTTAAATGCA GTTGCTGCCA TTCTTGCAAT TATCTCTGTG GTGGCCGTGT     360
TTGAGAACCA CAATGTTAAC AATATAGCCA ATATGTACAG TCTGCACAGC TGGGTTGGAC     420
TGATAGCTGT CATATGCTAT TTGTTACAGC TTCTTTCAGG TTTTTCAGTC TTTCTGCTTC     480
CATGGGCTCC GCTTTCTCTC CGAGCATTTC TCATGCCCAT ACATGTTTAT TCTGGAATTG     540
TCATCTTTGG AACAGTGATT GCAACAGCAC TTATGGGATT GACAGAGAAA CTGATTTTTT     600
CCCTGAGAGA TCCTGCATAC AGTACATTCC CGCCAGAAGG TGTTTTCGTA AATACGCTTG     660
GCCTTCTGAT CCTGGTGTTC GGGGCCCTCA TTTTTTGGAT AGTCACCAGA CCGCAATGGA     720
AACGTCCTAA GGAGCCAAAT TCTACCATTC TTCATCCAAA TGGAGGCACT GAACAGGGAG     780
CAAGAGGTTC CATGCCAGCC TACTCTGGCA ACAACATGGA CAAATCAGAT TCAGAGTTAA     840
ACARTGAAGT AGCAGCAAGG AAAAGAAACT TAGCTCTGGA TGAGGCTGGG CAGAGATCTA     900
CCATGTAAAA TGTTGTAGAG ATAGAGCCAT ATAACGTCAC GTTTCAAAAC TAGCTCTACA     960
GTTTTGCTTC TCCTATTAGC CATATGATAA TTGGGCTATG TAGTATCAAT ATTTACTTTA    1020
ATCACAAAGG ATGGTTTCTT GAAATAATTT GTATTGATTG AGGGCTATGA ACTGACCTGA    1080
ATTGGAAAGG ATGTGATTAA TATAAATAAT AGCAGATATA AATTGTGGTT ATGTTACCTT    1140
TATCTTGTTG AGGACCACAA CATTAGCACG GTGCCTTGTG CAKAATAGAT ACTCAATATG    1200
TGAATATGTG TCTACTAGTA GTTAATTGGA TAAACTGGCA GCATCCCTGA               1250
```

(2) INFORMATION FOR SEQ ID NO: 231:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 1811 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 231:

```
CNGNCAGTAC CGGTCNGATT CCCGGGTCGA CCCACGCGTC CGCTGCATTC CAGGGCCTTT   60
CAGTCGCTTT CATTCTGAAG TTCCTGGATA ACATGTTCCA TGTCTTGATG GCCCAGGTTA  120
CCASTGTCAT TATCACAACA GTGTCTGTCC TGGTCTTTGA CTTCAGGCCC TCCCTGGAAT  180
TTTTCTTGGA AGCCSCATCA GTCSTYCTCT CTATATTTAT TTATAATGCC AGCAAGCCTC  240
AAGTTCCGGA ATACGCACCT AGGCAAGAAA GGATCCGAGA TCTAAGTGGC AATCTTTGGG  300
AGCGTTCCAG TGGGGATGGA GAAGAACTAG AAAGACTTAC CAAACCCAAG AGTGATGAGT  360
CAGATGAAGA TACTTTCTAA CTGGTACCCA CATAGTTTGC AGCTCTCTTG AACCTTATTT  420
TCACATTTTC AGTGTTTGTA ATATTTATCT TTTCACTTTG ATAAACCAGA AATGTTTCTA  480
AATCCTAATA TTCTTTGCAT ATATCTAGCT ACTCCCTAAA TGGTTCCATC CAAGGCTTAG  540
AGTACCCAAA GGCTAAGAAA TTCTAAAGAA CTGATACAGG AGTAACAATA TGAAGAATTC  600
ATTAATATCT CAGTACTTGA TAAATCAGAA AGTTATATGT GCAGATTATT TTCCTTGGCC  660
TTCAAGCTTC CAAAAAACTT GTAATAATCA TGTTAGCTAT AGCTTGTATA TACACATAGA  720
GATCAATTTG CCAAATATTC ACAATCATGT AGTTCTAGTT TACATGCCAA AGTCTTCCCT  780
TTTTAACATT ATAAAAGCTA GGTTGTCTCT TGAATTTTGA GGCCCTAGAG ATAGTCATTT  840
TGCAAGTAAA GAGCAACGGG ACCCTTTCTA AAAACGTTGG TTGAAGGACC TAAATACCTG  900
GCCATACCAT AGATTTGGGA TGATGTAGTC TGTGCTAAAT ATTTTGCTGA AGAAGCAGTT  960
TCTCAGACAC AACATCTCAG AATTTTAATT TTTAGAAATT CATGGGAAAT TGGATTTTTG 1020
TAATAATCTT TTGATGTTTT AAACATTGGT TCCCTAGTCA CCATAGTTAC CACTTGTATT 1080
TTAAGTCATT TAAACAAGCC ACGGTGGGGC TTTTTTCTCC TCAGTTTGAG GAGAAAAATC 1140
TTGATGTCAT TACTCCTGAA TTATTACATT TTGGAGAATA AGAGGGCATT TTATTTTATT 1200
AGTTACTAAT TCAAGCTGTG ACTATTGTAT ATCTTTCCAA GAGTTGAAAT GCTGGCTTCA 1260
GAATCATACC AGATTGTCAG TGAAGCTGAT GCCTAGGAAC TTTTAAAGGG ATCCTTTCAA 1320
AAGGATCACT TAGCAAACAC ATGTTGACTT TTAACTGATG TATGAATATT AATACTCTAA 1380
AAATAGAAAG ACCAGTAATA TATAAGTCAC TTTACAGTGC TACTTCACAC TTAAAAGTGC 1440
ATGGTATTTT TCATGGTATT TTGCATGCAG CCAGTTAACT CTCGTAGATA GAGAAGTCAG 1500
GTGATAGATG ATATTAAAAA TTAGCAAACA AAAGTGACTT GCTCAGGGTC ATGCAGCTGG 1560
GTGATGATAG AAGAGTGGGC TTTAACTGGC AGGCCTGTAT GTTTACAGAC TACCATACTG 1620
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TAAATATGAG CTTTATGGTG TCATTCTCAG AAACTTATAC ATTTCTGCTC TCCTTTCTCC 1680

TAAGTTTCAT GCAGATGAAT ATAAGGTAAT ATACTATTAT ATAATTCATT TGTGATATCC 1740

ACAATAATAT GACTGGCAAG AATTGGTGGA AATTTGTAAT TAAAATAATT ATTAAACCTA 1800

AAAAAAAAAN N 1811

(2) INFORMATION FOR SEQ ID NO: 232:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 2271 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 232:

CTGACCTCAT GGCGTAGAGC CTAGCAACAG CGCAGGCTCC CAGCCGAGTC CGTTATGGCC 60

GCTGCCGTCC CGAAGAGGAT GAGGGGGCCA GCACAAGCGA AACTGCTGCC CGGGTCGGCC 120

ATCCAAGCCC TTGTGGGGTT GGCGCGGCCG CTGGTCTTGG CGCTCCTGCT TGTGTCCGCC 180

GCTCTATCCA GTGTTGTATC ACGGACTGAT TCACCGAGCC CAACCGTACT CAACTCACAT 240

ATTTCTACCC CAAATGTGAA TGCTTTAACA CATGAAAACC AAACCAAACC TTCTATTTCC 300

CAAATCAGCA CCACCCTCCC TCCCACGACG AGTACCAAGA AAAGTGGAGG AGCATCTGTG 360

GTCCCTCATC CCTCGCCTAC TCCTCTGTCT CAAGAGGAAG CTGATAACAA TGAAGATCCT 420

AGTATAGAGG AGGAGGATCT TCTGATGCTG AACAGTTCTC CATCCACAGC CAAAGACACT 480

CTAGACAATG GCGATTATGG AGAACCAGAC TATGACTGGA CCACGGGCCC CAGGGACGAC 540

GACGAGTCTG ATNGACACCT TGGAAGAAAA CAGCGGTTAC ATGGAAATTG AACAGTCAGT 600

GAAATCTTTT AAGATGCCAT CCTCAAATAT AGAAGAGGAA GACAGCCATT TCTTTTTTCA 660

TCTTATTATT TTTGCTTTTT GCATTGCTGT TGTTTACATT ACATATCACA ACAAAAGGAA 720

GATTTTTCTT CTGGTTCAAA GCAGGAAATG GCGTGATGGC CTTTGTTCCA AAACAGTGGA 780

ATACCATCGC CTAGATCAGA ATGTTAATGA GGCAATGCCT TCTTTGAAGA TTACCAATGA 840

TTATATTTTT TAAAGCACTG TGATTTGAAT TTGCTTATGT AATTTTATTT GCTTGACTTT 900

TTATATGATA TTGTGCAAAT GTTTGCCATA GGCAATTGGT ACTTAAATGA GAGGTGAGTC 960

TCTCTTTTGC CTTGGTGCTT TGGAAATTAA ATGTCACAAA CGAGTATATA ATTTTTTATC 1020

TGTACTTTTA GAGCTGAGTT TAATCAGGTG TCCAAAATGT GAGTTAAACA TTACCTTATA 1080

TTTACACTGT TAGTTTTTAT TGTTTTAGAT TTATTATGCT TCTTCTGGAA GTATTAGTGA 1140

TGCTACTTTT AAAAGATCCC AAACTTGTAA CTAAATTCTG ACATATCTGT TACTGCTGAC 1200
TCACATTCAT TCTCCGCCAT TCAAATACTA TTTTTTATCC ACATTTTTTT TTGTTCCCAA 1260
ACTGTAATGT ACAAGGATAT GTGTGATAAT GCTTTGGATT TGAGTAATAT TTTTTTTTCT 1320
TCCAAGAAAA CTGCTTTGGA TATTTTTAGA TAATTTAAAC ATAATTTAGG ATAATGATAT 1380
TGCTCAATCT GACCACAATT TTAGGTAAAA CATTAAATGT GTCAAGAAAT CTTGGCAACA 1440
GAGACTCTGC AGCTTGCAGT GGACATAGAT AAAATGTTAC AGAGATACTA TTTTTTTGGT 1500
TGGAATTACT ATATTAAATT TAGAAGCAGA AACTGGTAAA ATGTTAAATA CATGTACAAT 1560
TGCTTTTAGT TAGCAATTGA TTGTAGCATG GGTTCCTCCA AGGTTTCAAG CAATGGGCAG 1620
AGTTTAAAAT TATATCAGAT TCGTTTACTT CGTTTATTAT TTTACAGTAA ATTTGAATAA 1680
ATCTTAGGGG TCATTATCAC TTAAATAATA CTGTACCTAG GTCTTTCAAA TTAAAATTAT 1740
ACCTGAATGA AGTTGTTTGT ATACATAAAG GATATTTGTG TACAATTACC TTTTTTCCCC 1800
CACACTTGTT TTCTTTGTTT TTGTTTTTTA TGGCAACTGG AAAGTATTTA CTATGGGATT 1860
CATTTATGTC TGTCTTTCTA TCATAAAGAA TTGATCAATA TGTAAATATG TGATTTGAAC 1920
CATGGTTGAC TTACAAGTGT CACTACAGCT TTTTAGAAAA CATAGCCCTA ATATATGTTA 1980
AGCAGGACCC GGGTGAGCCA GTGGGCTTGC GCTTTATGTA GAGCTGGAAG AAGGCCGTCC 2040
ATCCTGTCTC TTGGGCGGAC AGTGTACTTT CCTAATAGGG AAGGGAAGCA CAATGGAAAT 2100
ACCCCTGAAC CGTTTTATTG CAGTAATTTT TTTCATATCT GAAACTATTA TTTAATATTT 2160
TGAATAAGAT TTTAAAAAAT AAATGGCAAA GATATAAATC TAAAAAAAAA AAAAAAAAAA 2220
AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAAAAA AAAAAAANANA N 2271

(2) INFORMATION FOR SEQ ID NO: 233:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 1338 base pairs
(B) TYPE: nucleic acid
(C) STRANDEDNESS: double
(D) TOPOLOGY: linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 233:

CTTCCGGTTC TCCGGGCAGC TGCCACTGCT GTAGCTTCTG CCACCTGCCA CGACCGGGCC 60
TCTCCCTGGC GTTTGGTCAC CTCTGCTTCA TTCTCCACCG CGCCTATGGT CCCTCTTGGA 120
GCCAGCGTGG CGNGCCTGGC GGCTCCCGGG TGGTGAGAGA GCGGTCCGGG AACGATGAAG 180
GCCTCGCAGT GCTGCTGCTG TCTCAGCCAC CTCTTGGCTT CCGTCCTCCT CCTGCTGTTG 240
CTGCCTGAAC TAAGCGGGYC CCTGGMAGTC CTGCTGCAGG CAGCCGAGGC CGCGCCAGGT 300

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YTTGGGCCTC CTGACCCTAG ACCAGGACAT TACCGCCGCT GCCACCGGGC CCTWACCCCT     360
GCCCAGCAGC CGGGCCGTGG TCTGGCTGAA GCTGCGGGGG CCGCGGGGCT CCGAGGGAGG     420
CAATGGCAGC AACCCTGTGG CCGGGCTTGA GACGGACGAT CACGGAGGGA AGGCCGGGGA     480
ARGCTCGGTG GGTGGCGGCC TTGCTGTGAG CCCCAACCCT GGCGACAAGC CCATGACCCA     540
GCGGGCCCTG ACCGTGTTGA TGGTGGTGAG CGGCGCGGTG CTGGTGTACT TCGTGGTCAG     600
GACGGTCAGG ATGAGAAGAA GAAACCGAAA GACTAGGAGA TATGGAGTTT TGGACACTAA     660
CATAGAAAAT ATGGAATTGA CACCTTTAGA ACAGGATGAT GAGGATGATG ACAACACGTT     720
GTTTGATGCC AATCATCCTC GAAGATAAGA ATGTGCCTTT TGATGAAAGA ACTTTATCTT     780
TCTACAATGA AGAGTGGAAT TTCTATGTTT AAGGAATAAG AAGCCACTAT ATCAATGTTG     840
GGGGGGTATT TAAGTTACAT ATATTTNAAC AACCTTTAAT TTGCTGTTGC AATAAATACC     900
GTATCCTTTT ATTATATCTT TATATGTATA GAAGTACTCT GTTAATGGGC TCAGAGATGT     960
TGGGGATAAA GTATACTGTA ATAATTTATC TGTTTGAAAA TTACTATAAA ACGGTGTTTT    1020
CTGRTCGGTT TTTGTTTCCT GCTTACCATA TGATTGTAAA TTGTTTTATG TATTAATCAG    1080
TTAATGCTAA TTATTTTTGC TGATGTCATA TGTTAAAGAG CTATAAATTC CAACAACCAA    1140
CTGGTGTGTA AAAATAATTT AAAATYTCCT TTACTGAAAG GTATTTCCCA TTTTTGTGGG    1200
GAAAAGAAGC CAAATTTATT ACTTTGTGTT GGGGTTTTTA AAATATTAAG AAATGTCTAA    1260
GTTATTGTTT GCAAAACAAT AAATATGATT TTAAATTCTC TTAAAAAAAA AAAAAAAAAC    1320
CCCGGGGGGG GGCCCGGN                                                 1338
```

(2) INFORMATION FOR SEQ ID NO: 234:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 31 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 234:

```
Met Leu Ser Thr Gly Ile Glu Val Ala Arg Pro Pro Ala Thr Leu Leu
  1               5                  10                  15

Gly Leu Met Phe Val Leu Thr Gly Met Pro Arg Gly Leu Arg Xaa
             20                  25                  30
```

(2) INFORMATION FOR SEQ ID NO: 235:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 116 amino acids

(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 235:

Met Asn Val Val Ile Val Ile Ile Leu Phe Ser Phe Asp Ser Val Gly
1 5 10 15

Thr Met Phe Ser Cys Asn Arg Ile Pro Lys Ile Thr Val Leu Asn Lys
20 25 30

Leu Lys Phe Xaa Cys Glu Val Leu Leu Arg Ile Gln Thr Ile Gln Gly
35 40 45

Phe Tyr Arg Cys Thr Arg Ile Ser Arg Tyr Lys Gly Ile Phe Pro Asp
50 55 60

Phe Cys Gln Ser Gln Cys Met Gly Cys Asn Pro Glu Ser Xaa Met Ala
65 70 75 80

Val Pro Ala Leu Val Thr Pro Ile Leu Ala His Arg Lys Lys Glu Lys
85 90 95

Gly Met Cys Leu Phe Thr Leu Ile Ile Ala Pro Thr Arg Cys Thr His
100 105 110

Tyr Phe Cys Xaa
115

(2) INFORMATION FOR SEQ ID NO: 236:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 103 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 236:

Met Ser Ser Ala Lys Ile Val Arg Gln Arg Gly Ala Val Pro Thr Tyr
1 5 10 15

Tyr Thr Thr Glu Ala Gly Glu Ile Ile Phe Leu Val Leu Asn Trp Ser
20 25 30

Leu Ser Ile Leu His Ile Val Asp Val Leu Cys Ser Lys Pro Glu Lys
35 40 45

Ser Val Thr Glu Asp Ala Ala Ser Gly Leu Ser Gln Arg Met Thr Ala
50 55 60

Leu Val Trp Arg Lys Gly Pro Asp Gly Gly Ser Arg Lys Pro Ile Leu
65 70 75 80

Leu Leu Phe Phe Phe Leu Pro Leu Ile Leu Cys Phe His Ser Phe Ile
85 90 95

His Ser Ser Asn Ile Cys Xaa
100

(2) INFORMATION FOR SEQ ID NO: 237:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 42 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 237:

```
Met Ile Leu Phe Pro Gln Xaa Ala Leu Arg Leu Gly Xaa Trp Pro Arg
 1               5                  10                  15

Thr Trp Ser Ile Leu Xaa Lys Tyr Ser Val Asn Phe Phe Ser Ala Tyr
            20                  25                  30

Ser Pro Met Gly Ala Val Gly Thr Glu Phe
        35                  40
```

(2) INFORMATION FOR SEQ ID NO: 238:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 37 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 238:

```
Met Ile Ile Leu Leu Leu Phe Met Leu Leu Asn Asn Val Val Leu Val
 1               5                  10                  15

Gln Glu Asp Asn Cys Gln Arg Lys Asn Thr Val Gln Glu Arg Arg Xaa
            20                  25                  30

Trp Ser Gln Trp Xaa
        35
```

(2) INFORMATION FOR SEQ ID NO: 239:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 128 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 239:

```
Met Ala Ala Xaa Pro Pro Gly Cys Thr Pro Pro Xaa Leu Leu Asp Ile
 1               5                  10                  15

Ser Trp Leu Thr Glu Ser Leu Gly Ala Gly Gln Pro Val Pro Val Glu
            20                  25                  30

Cys Arg His Arg Leu Glu Val Ala Gly Pro Arg Lys Gly Pro Leu Ser
        35                  40                  45

Pro Ala Trp Met Pro Ala Tyr Ala Cys Gln Arg Pro Thr Pro Leu Thr
    50                  55                  60

His His Asn Thr Gly Leu Ser Glu Leu Leu Glu His Gly Val Cys Glu
```

65 70 75 80

Glu Val Glu Arg Val Arg Arg Ser Glu Arg Tyr Gln Thr Met Lys Val
85 90 95

Arg Arg Ala Gly Leu Gly Pro Thr Pro Gly Met Ser Cys Pro Gly Asn
100 105 110

Asp Asn Thr Val His Thr Met His Gly Glu Ala Asn Arg Gly Ser Xaa
115 120 125

(2) INFORMATION FOR SEQ ID NO: 240:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 67 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 240:

Met Ser Ile Leu Cys Cys Pro Xaa Leu Cys Leu Phe Phe Ser Phe Cys
1 5 10 15

Ile Ser Ser Gly Ser Cys Pro Phe Ser His Val Ser Gln Leu Ser Phe
20 25 30

Ile Ala Thr Phe Ser Gln Ser Ser Pro Val Leu Leu Val Pro Ala Tyr
35 40 45

Asn Thr Tyr Leu Ser Phe Leu Ala Phe Leu Asp Cys Ala Ser Leu Thr
50 55 60

Ser Thr Xaa
65

(2) INFORMATION FOR SEQ ID NO: 241:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 69 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 241:

Met Ser Thr Phe Gln Leu Leu Leu Leu Ile Leu Ala Gln Ser Thr Tyr
1 5 10 15

Lys Ile Lys Ser Lys Pro Leu His Met Thr Asn His Thr Leu Leu Asn
20 25 30

Ser Pro Gly Leu Asn Pro Ser Ser Pro Thr Leu Asn Phe Lys Thr Gln
35 40 45

Gln His Glu Ser Val Ser Tyr Ala Cys Cys His Met Arg Ser Leu His
50 55 60

His Ala Phe Ala Xaa
65

(2) INFORMATION FOR SEQ ID NO: 242:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 44 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 242:

```
Met Val Ser Val Val Leu Ile Phe Ser Phe Leu Ser Leu Thr Ile Ser
 1               5                  10                  15

Thr Thr Ala Ser Ala Tyr Asn Gly Asn Asp Thr Gln Gly Trp Asn Asp
            20                  25                  30

Lys Phe His Xaa Xaa Ser Val Lys Thr Gln Thr Xaa
        35                  40
```

(2) INFORMATION FOR SEQ ID NO: 243:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 51 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 243:

```
Met Ile Ser Asp Ala Gly Ala Gly Phe Gly Val Phe Leu Leu Val Pro
 1               5                  10                  15

Arg Ala Gly His Cys Trp Gly Ala Gly Lys Pro Leu Pro Ser Cys Pro
            20                  25                  30

Ser Val Ala Ser Ile Pro Ser Trp Val Leu Pro Ser Phe Leu Glu Arg
        35                  40                  45

Gly Arg Xaa
    50
```

(2) INFORMATION FOR SEQ ID NO: 244:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 43 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 244:

```
Met Val Gln Thr Ile Gln Asp Phe Leu Ser Leu Phe Ser Thr Pro Ile
 1               5                  10                  15

Phe Leu Leu Leu Leu Met Phe Glu Thr Leu Ser Leu Ala Pro Ala Trp
            20                  25                  30
```

Leu Lys Pro Leu Arg Val Thr Ser His Ser Xaa
35 40

(2) INFORMATION FOR SEQ ID NO: 245:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 61 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 245:

Met Ile Leu Met Pro Gly Leu Gly Thr Ser Arg Gln Arg Ser Val Pro
1 5 10 15

Phe Val Pro Thr Leu Asn Ala Ser Thr Pro Gly Ala Met Thr Gly Pro
20 25 30

Thr Ala Thr Leu Thr Ser Cys Gln Trp Thr Thr Ala Cys Arg Val Ser
35 40 45

Trp Ala Asn Gly Trp Thr Ser Leu Arg Thr Phe Arg Xaa
50 55 60

(2) INFORMATION FOR SEQ ID NO: 246:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 35 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 246:

Met Ser His His Ala Gln Pro Arg Phe Leu Leu Ile Thr Met Leu Leu
1 5 10 15

Gln Glu Ala Lys Pro Val Ser Asn Ile Pro His Leu Leu Glu Ser Trp
20 25 30

Tyr Phe Gly Xaa
35

(2) INFORMATION FOR SEQ ID NO: 247:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 33 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 247:

Met Asn Ser Leu Phe Trp Met Ile Leu Leu Pro Val Ser Gln Asp Gln
1 5 10 15

Val Val Glu Gly Leu Gln Gly Gly Phe Ser Gln Ile His Met Arg Ile
20 25 30

Leu Arg Lys His Leu Xaa
35

(2) INFORMATION FOR SEQ ID NO: 248:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 211 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 248:

```
Met Ser Arg Ser Xaa Asp Val Thr Asn Thr Thr Phe Leu Leu Met Ala
  1               5                  10                  15

Ala Ser Ile Tyr Leu His Asp Gln Asn Pro Asp Ala Ala Leu Arg Ala
             20                  25                  30

Leu His Gln Gly Asp Ser Leu Glu Cys Thr Ala Met Thr Val Gln Ile
         35                  40                  45

Leu Leu Lys Leu Asp Arg Leu Asp Leu Ala Arg Lys Glu Leu Lys Arg
     50                  55                  60

Met Gln Asp Leu Asp Glu Asp Ala Thr Leu Thr Gln Leu Ala Thr Ala
 65                  70                  75                  80

Trp Val Ser Leu Ala Thr Gly Gly Glu Lys Leu Gln Asp Ala Tyr Tyr
                 85                  90                  95

Ile Phe Gln Glu Met Ala Asp Lys Cys Ser Pro Thr Leu Leu Leu Leu
            100                 105                 110

Asn Gly Gln Ala Ala Cys His Met Ala Gln Gly Arg Trp Glu Ala Ala
        115                 120                 125

Glu Gly Leu Leu Gln Glu Ala Leu Asp Lys Asp Ser Gly Tyr Pro Glu
    130                 135                 140

Thr Leu Val Asn Leu Ile Val Leu Ser Gln His Leu Gly Lys Pro Pro
145                 150                 155                 160

Glu Val Thr Asn Arg Tyr Leu Ser Gln Leu Lys Asp Ala His Arg Ser
                165                 170                 175

His Pro Phe Ile Lys Glu Tyr Gln Ala Lys Glu Asn Asp Phe Asp Arg
            180                 185                 190

Leu Val Leu Gln Tyr Ala Pro Ser Ala Glu Ala Gly Pro Glu Leu Ser
        195                 200                 205

Gly Pro Xaa
    210
```

(2) INFORMATION FOR SEQ ID NO: 249:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 548 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 249:

```
Met Glu Asp Ser Glu Ala Leu Gly Phe Glu His Met Gly Leu Asp Pro
  1               5                  10                  15

Arg Leu Leu Gln Ala Val Thr Asp Leu Gly Trp Ser Arg Pro Thr Leu
             20                  25                  30

Ile Gln Glu Lys Ala Ile Pro Leu Ala Leu Glu Gly Lys Asp Leu Leu
         35                  40                  45

Ala Arg Ala Arg Thr Gly Ser Gly Lys Thr Ala Ala Tyr Ala Ile Pro
     50                  55                  60

Met Leu Gln Leu Leu Leu His Arg Lys Ala Thr Gly Pro Val Val Glu
 65                  70                  75                  80

Gln Ala Val Arg Gly Leu Val Leu Val Pro Thr Lys Glu Leu Ala Arg
                 85                  90                  95

Gln Ala Gln Ser Met Ile Gln Gln Leu Ala Thr Tyr Cys Ala Arg Asp
            100                 105                 110

Val Arg Val Ala Asn Val Ser Ala Ala Glu Asp Ser Val Ser Gln Arg
        115                 120                 125

Ala Val Leu Met Glu Lys Pro Asp Val Val Val Gly Thr Pro Ser Arg
    130                 135                 140

Ile Leu Ser His Leu Gln Gln Asp Ser Leu Lys Leu Arg Asp Ser Leu
145                 150                 155                 160

Glu Leu Leu Val Val Asp Glu Ala Asp Leu Leu Phe Ser Phe Gly Phe
                165                 170                 175

Glu Glu Glu Leu Lys Ser Leu Leu Cys His Leu Pro Arg Ile Tyr Gln
            180                 185                 190

Ala Phe Leu Met Ser Ala Thr Phe Asn Glu Asp Val Gln Ala Leu Lys
        195                 200                 205

Glu Leu Ile Leu His Asn Pro Val Thr Leu Lys Leu Gln Glu Ser Gln
    210                 215                 220

Leu Pro Gly Pro Asp Gln Leu Gln Gln Phe Gln Val Val Cys Glu Thr
225                 230                 235                 240

Glu Glu Asp Lys Phe Leu Leu Leu Tyr Ala Leu Leu Lys Leu Ser Leu
                245                 250                 255

Ile Arg Gly Lys Ser Leu Leu Phe Val Asn Thr Leu Glu Arg Ser Tyr
            260                 265                 270

Arg Leu Arg Leu Phe Leu Glu Gln Phe Ser Ile Pro Thr Cys Val Leu
        275                 280                 285
```

```
Asn Gly Glu Leu Pro Leu Arg Ser Arg Cys His Ile Ile Ser Gln Phe
    290                 295                 300

Asn Gln Gly Phe Tyr Asp Cys Val Ile Ala Thr Asp Ala Glu Val Leu
305                 310                 315                 320

Gly Ala Pro Val Lys Gly Lys Arg Arg Gly Arg Gly Pro Lys Gly Asp
                325                 330                 335

Lys Ala Ser Asp Pro Glu Ala Gly Val Ala Arg Gly Ile Asp Phe His
            340                 345                 350

His Val Ser Ala Val Leu Asn Phe Asp Leu Pro Pro Thr Pro Glu Ala
        355                 360                 365

Tyr Ile His Arg Ala Gly Arg Thr Ala Arg Ala Asn Asn Pro Gly Ile
    370                 375                 380

Val Leu Thr Phe Val Leu Pro Thr Glu Gln Phe His Leu Gly Lys Ile
385                 390                 395                 400

Glu Glu Leu Leu Ser Gly Glu Asn Arg Gly Pro Ile Leu Leu Pro Tyr
                405                 410                 415

Gln Phe Arg Met Glu Glu Ile Glu Gly Phe Arg Tyr Arg Cys Arg Asp
            420                 425                 430

Ala Met Arg Ser Val Thr Lys Gln Ala Ile Arg Glu Ala Arg Leu Lys
        435                 440                 445

Glu Ile Lys Glu Glu Leu Leu His Ser Glu Lys Leu Lys Thr Tyr Phe
    450                 455                 460

Glu Asp Asn Pro Arg Asp Leu Gln Leu Leu Arg His Asp Leu Pro Leu
465                 470                 475                 480

His Pro Ala Val Val Lys Pro His Leu Gly His Val Pro Asp Tyr Leu
                485                 490                 495

Val Pro Pro Ala Leu Arg Gly Leu Val Arg Pro His Lys Lys Arg Lys
            500                 505                 510

Lys Leu Ser Ser Ser Cys Arg Lys Ala Lys Arg Ala Lys Ser Gln Asn
        515                 520                 525

Pro Leu Arg Ser Phe Lys His Lys Gly Lys Lys Phe Arg Pro Thr Ala
    530                 535                 540

Lys Pro Ser Xaa
545
```

(2) INFORMATION FOR SEQ ID NO: 250:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 299 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 250:

Met Thr Thr Val Pro Pro Ser Pro Arg Pro Met Ser Arg Pro Ser Glu
1 5 10 15

Arg Asn Met Arg Arg Pro Arg Gly Pro Ser Pro Leu Pro Ala Ser Pro
20 25 30

Arg Asn Ser Thr Pro Asp Glu Pro Asp Val His Phe Ser Lys Lys Phe
35 40 45

Leu Asn Val Phe Met Ser Gly Arg Ser Arg Ser Ser Ser Ala Glu Ser
50 55 60

Phe Gly Leu Phe Ser Cys Ile Ile Asn Gly Glu Glu Gln Glu Gln Thr
65 70 75 80

His Arg Ala Ile Phe Arg Phe Val Pro Arg His Glu Asp Glu Leu Glu
85 90 95

Leu Glu Val Asp Asp Pro Leu Leu Val Glu Leu Gln Ala Glu Asp Tyr
100 105 110

Trp Tyr Glu Ala Tyr Asn Met Arg Thr Gly Ala Arg Gly Val Phe Pro
115 120 125

Ala Tyr Tyr Ala Ile Glu Val Thr Lys Glu Pro Glu His Met Ala Ala
130 135 140

Leu Ala Lys Asn Ser Asp Trp Val Asp Gln Phe Arg Val Lys Phe Leu
145 150 155 160

Gly Ser Val Gln Val Pro Tyr His Lys Gly Asn Asp Val Leu Cys Ala
165 170 175

Ala Met Gln Lys Ile Ala Thr Thr Arg Arg Leu Thr Val His Phe Asn
180 185 190

Pro Pro Ser Ser Cys Val Leu Glu Ile Ser Val Arg Gly Val Lys Ile
195 200 205

Gly Val Lys Ala Asp Asp Ser Gln Glu Ala Lys Gly Asn Lys Cys Ser
210 215 220

His Phe Phe Gln Leu Lys Asn Ile Ser Phe Cys Gly Tyr His Pro Lys
225 230 235 240

Asn Asn Lys Tyr Phe Gly Phe Ile Thr Lys His Pro Ala Asp His Arg
245 250 255

Phe Ala Cys His Val Phe Val Ser Glu Asp Ser Thr Lys Ala Leu Ala
260 265 270

Glu Ser Val Gly Arg Ala Phe Gln Gln Phe Tyr Lys Gln Phe Val Glu
275 280 285

Tyr Thr Cys Pro Thr Glu Asp Ile Tyr Leu Glu
290 295

(2) INFORMATION FOR SEQ ID NO: 251:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 40 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 251:

```
Leu Leu Tyr Leu Leu Lys Val Xaa Val Ile Phe Val Phe Ser Ser Ser
  1               5                  10                  15

Lys Gly Val Thr Leu Val Ser Met Asn Leu Thr Ser Phe Phe Val Ser
             20                  25                  30

Ser Val Leu Ala Cys Phe Ser Xaa
         35                  40
```

(2) INFORMATION FOR SEQ ID NO: 252:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 594 amino acids
(B) TYPE: amino acid
(D) TOPOLOGY: linear
(xi) SEQUENCE DESCRIPTION: SEQ ID NO: 252:

```
Met Pro Ala Ser Ser Leu Glu Ser Arg Ser Phe Leu Leu Ala Lys Lys
  1               5                  10                  15

Ser Gly Glu Asn Val Ala Lys Phe Ile Ile Asn Ser Tyr Pro Lys Tyr
             20                  25                  30

Phe Gln Lys Asp Ile Ala Glu Pro His Ile Pro Cys Leu Met Pro Glu
         35                  40                  45

Tyr Phe Glu Pro Gln Ile Lys Asp Ile Ser Glu Ala Ala Leu Lys Glu
     50                  55                  60

Arg Ile Glu Leu Arg Lys Val Lys Ala Ser Val Asp Met Phe Asp Gln
 65                  70                  75                  80

Leu Leu Gln Ala Gly Thr Thr Val Ser Leu Glu Thr Thr Asn Ser Leu
                 85                  90                  95

Leu Asp Xaa Leu Cys Tyr Tyr Gly Asp Gln Glu Pro Ser Thr Asp Tyr
            100                 105                 110

His Phe Gln Gln Thr Gly Gln Ser Glu Ala Leu Glu Glu Glu Asn Asp
        115                 120                 125

Glu Thr Ser Arg Arg Lys Ala Gly His Gln Phe Gly Val Thr Trp Arg
    130                 135                 140

Ala Lys Asn Asn Ala Glu Arg Ile Phe Ser Leu Met Pro Glu Lys Asn
145                 150                 155                 160

Glu His Ser Tyr Cys Thr Met Ile Arg Gly Met Val Lys His Arg Ala
                165                 170                 175
```

Tyr Glu Gln Ala Leu Asn Leu Tyr Thr Glu Leu Leu Asn Asn Arg Leu
180 185 190

His Ala Asp Val Tyr Thr Phe Asn Ala Leu Ile Glu Ala Thr Val Cys
195 200 205

Ala Ile Asn Glu Lys Phe Glu Glu Lys Trp Ser Lys Ile Leu Glu Leu
210 215 220

Leu Arg His Met Val Ala Gln Lys Val Lys Pro Asn Leu Gln Thr Phe
225 230 235 240

Asn Thr Ile Leu Lys Cys Leu Arg Arg Phe His Val Phe Ala Arg Ser
245 250 255

Pro Ala Leu Gln Val Leu Arg Glu Met Lys Ala Ile Gly Ile Glu Pro
260 265 270

Ser Leu Ala Thr Tyr His His Ile Ile Arg Leu Phe Asp Gln Pro Gly
275 280 285

Asp Pro Leu Lys Arg Ser Ser Phe Ile Ile Tyr Asp Ile Met Asn Glu
290 295 300

Leu Met Gly Lys Arg Phe Ser Pro Lys Asp Pro Asp Asp Asp Lys Phe
305 310 315 320

Phe Gln Ser Ala Met Ser Ile Cys Ser Ser Leu Arg Asp Leu Glu Leu
325 330 335

Ala Tyr Gln Val His Gly Leu Leu Lys Thr Gly Asp Asn Trp Lys Phe
340 345 350

Ile Gly Pro Asp Gln His Arg Asn Phe Tyr Tyr Ser Lys Phe Phe Asp
355 360 365

Leu Ile Cys Leu Met Glu Gln Ile Asp Val Thr Leu Lys Trp Tyr Glu
370 375 380

Asp Leu Ile Pro Ser Ala Tyr Phe Pro His Ser Gln Thr Met Ile His
385 390 395 400

Leu Leu Gln Ala Leu Asp Val Ala Asn Arg Leu Glu Val Ile Pro Lys
405 410 415

Ile Trp Lys Asp Ser Lys Glu Tyr Gly His Thr Phe Arg Ser Asp Leu
420 425 430

Arg Glu Glu Ile Leu Met Leu Met Ala Arg Asp Lys His Pro Pro Glu
435 440 445

Leu Gln Val Ala Phe Ala Asp Cys Ala Ala Asp Ile Lys Ser Ala Tyr
450 455 460

Glu Ser Gln Pro Ile Arg Gln Thr Ala Gln Asp Trp Pro Ala Thr Ser
465 470 475 480

Leu Asn Cys Ile Ala Ile Leu Phe Leu Arg Ala Gly Arg Thr Gln Glu
485 490 495